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REPORT

ON THE

OPERATIONS OF THE AGRICULTURAL DEPARTMENT,

MADRAS PRESIDENCY,

FOR THE OFFICIAL YEAR

1889-90.

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1891.

PROCEEDINGS OF THE BOARD OF REVENUE

(Revenue Settlement, Land Records and Agriculture).

Mr. Clogstoun.

Resolution—dated 10th September 1890, No. 275-A.

The Board resolves to submit to Government its review of the operations of the Department of Land Records and Agriculture for the year 1889-90.

2. Mr. Wilson remained in charge of the department till the end of September, when he resigned the service, and was succeeded by Mr. Clogstoun, who returned from furlough to take up his appointment towards the end of October. There were no other changes amongst the superior officers of the Department. The Committee alluded to in paragraph 4 of the last report laid their report before the Government in May 1889 and final orders on it were received in July 1890, that is, after the close of the official year.

3. The Assistant Director's duties during the year were chiefly secretarial and as such cannot be detailed. He was called upon during the year to visit a number of the great cattle fairs held at different places in the Presidency with a view to his drawing up, jointly with the Inspector of Cattle Diseases, an account of the breeds of cattle in the Presidency. For this purpose he visited Madura and Sivaliperi (in Tinnevelly) during April, Avanáshi and Punganúr in May, the Tirupúr fair and the breeding herd of the Paleiyakota Pattegar in June, Tiruvannámalai in December and Sríraugam in March. The change which occurred in the appointment of the Director of the Department prevented his visiting Mahadésvaravadai in October, and the Subramania fair in South Canara during November. After visiting the cattle fair at Punganúr in May he proceeded to Madanapalle to inspect the village registers of that taluk and early in July he visited Cuddapah to arrange for a uniform method of check of the newly prescribed village registers of statistics by the special establishment sanctioned for the purpose; afterwards he proceeded on a tour in Tinnevelly to set on foot an enquiry as to the system under which cotton is grown in that district. Then after visiting Dindigul to inspect the progress made by Mr. Caine, the Tobacco Specialist, and to settle the plan for operation there during the year under report, he proceeded to Vellore to conduct a trial of water-lifts competing for the prize of Rs. 200 offered by the Government, and returned to Madras early in August. He remained at head-quarters during the ensuing three months, except for brief visits to Bellary and Salem in connection with the agricultural shows. In November he was again deputed to inspect Mr. Caine's work and to arrange for the settlement of certain claims which had arisen in connection therewith. Early in December he was called upon to proceed to Bellary for the agricultural show, from which he only returned at the beginning of the Christmas holidays, having remained in the district for a few days after the conclusion of the show to inspect the working by the ryots of Messrs. Massey and Co.'s cotton-soil ploughs, which have been sold in considerable numbers there. After his return from Sríraugam in January, nothing occurred to take the Assistant Director away from head-quarters until Dr. Voelcker came to Madras at the beginning of February in the course of the tour on which he was deputed by the Secretary of State to enquire into the best method of improving Indian agriculture by scientific means. He then accompanied Dr. Voelcker to Shiyáli, Madura, Coimbatore and Salem to show him something of the country and the conditions under which

agriculture is here carried on. At Salem he remained during the show, of which he, as Director of the Show-yard, had executive charge, and almost immediately on his return proceeded again to Dindigul and Tinnevelly to inspect Mr. Caine's work in connection with the tobacco experiments and that of the Agricultural Inspector engaged on the cotton enquiry. From this last tour he returned to Madras on March 8th and thereafter remained at head-quarters till the end of the year. Besides the ordinary secretarial duties which fall to him, Mr. Benson has been engaged in preparing a statistical atlas of the Presidency, somewhat on the lines of the Bombay atlas, and has completed the preliminary sketches of all the districts from Kistna southwards, except Tanjore, Nílgiris, Malabar and South Canara, as far as the information immediately available is concerned; and has carried those of the marginally-noted districts almost to completion, the chief work which remains to be completed being a determination of the areas on which the crops are protected during seasons of prolonged drought. For this, information is being collected.

Kurnool.	North Arcot.
Bellary.	Salem.
Anantapur.	Coimbatore.
Cuddapah.	

I.—Organization and maintenance of Village Records.

4. A full account has been given in the reports of the past two years of the steps taken from time to time to simplify the forms in which the village statistics are recorded and to improve the position of the village officers on whose efficiency the correct maintenance of these accounts chiefly depends. All Collectors report that the village accounts are fairly well kept and that they have been carefully scrutinized at the annual settlement (jamabandi). Since the date of the last report, the revision of village establishments has been sanctioned for South Arcot and Madura. The proposals relating to the Ganjam district have recently been submitted to Government and those for Cuddapah and Anantapur have been returned to the Collectors for revision. Since the close of the year the sanction of the Secretary of State has been received to the increase which had been repeatedly sought by the Local Government in the strength of the Revenue Inspector staff. This will enable the District officers to exercise a more efficient check than has hitherto been possible over the work of the village officers. The question of appointing a special officer as a Personal Assistant to the Director to supervise the work of the taluk and village establishments in connection with the maintenance of land records and survey marks was discussed during the year with the result that the Government has decided to recommend the appointment for the sanction of the Government of India.

5. Of the Revenue Inspectors now existing, some 400 have passed the Survey Test prescribed in G.O., dated 8th July 1885, No. 800, Revenue. This number includes 118 who passed the test in the year under report. In future, there will be 610 Revenue Inspectors on Rs. 40 and 35, instead of 525 on Rs. 30, 25 and 20 as hitherto.

II.—Analysis of Districts with reference to their Security from Famine.

6. *Kurnool.*—The analysis of this district, prepared by the Assistant Director, was submitted to Government during the year. It was reviewed by Government and published shortly after the year closed. It was not considered to have complied with the requirements of the Government of India, but as doubts existed as to what these requirements were, further instructions on the subject have been asked for and it is thought that when they are received, the work of analysing the village registers of statistics may for each district be entrusted to a Deputy Collector specially deputed for that purpose, working under the orders of Collectors.

7. *Cuddapah.*—The field work of the Agricultural Inspectors was completed in this district during June last, but the portion of the same work allotted to the Revenue Inspectors was not finished till considerably later on. The special establishment sanctioned to check and compare the village registers prepared in this district was working during the early part of the year, and it is reported that their work was completed in seven out of the eleven taluks of the district.

When the Assistant Director visited Cuddapah in July, he found that the check was not proceeding on any definite lines, and after further inquiry through the Agricultural Inspectors and after examining some of the registers of other districts which

were called for, the Board issued detailed instructions as to the method of checking the registers which should now proceed on a definite system. Owing to the doubts which had arisen as to what the Government of India actually required in these analyses (*vide* paragraph 10 of last report) all further detailed work in the Cuddapah district has been suspended till further orders.

8. *Other Districts.*—Owing to absence of proper village establishments, it was found necessary to abandon the idea of preparing the village registers for whole inam villages in the Ramnad and Sivaganga Zemindaris and also not to attempt to obtain figures for past years in the Pálkonda taluk of Vizagapatam, which has been under the management of Messrs. Arbuthnot and Co. as lessees for several years. The new settlement has just been introduced into this taluk and arrangements have been made for maintaining from the current year complete statistics of cultivation and revenue.

9. *Statistical Atlas.*—The preparation of an atlas bringing together the chief particulars regarding the economic condition of every district which are recorded in the annual statistics was put in hand during the year. This work was, as already noted, entrusted to the Assistant Director, when the Agricultural Inspectors who had completed their work in Cuddapah returned to head-quarters pending the issue of the orders anticipated from Government on the Agricultural Committee's Report. A completed sketch for Kurnool, together with a map to illustrate the memoir, was submitted to Government and received general approval; this has since been revised and completed as far as possible in accordance with the instructions of Government, and the work of preparing similar accounts of other districts has been carried nearly to completion in the case of all districts south of the Kistna. One great difficulty is however met with in preparing the maps and memoir, and that is in determining the area in which crops may be regarded as being practically safe in times of prolonged drought. Had the village records for the famine years 1876–78 been still available, this might have been easily determined, but notwithstanding strenuous endeavours, great delay may occur before these particulars are forthcoming even approximately.

10. The following table shows the progress made in all the districts up to the end of March 1890 in the preparation of the statistical registers ordered in connection with famine analysis :—

Districts.	Total number of villages, Government and Inam.	Number for which registers have been completed.	Number for which registers have been partially prepared.	Remarks.
Ganjam	1,528	205	148	
Vizagapatam		Completed.		
Godávari	1,370	1,138	211	
Kistna	1,359	1,065	288	
Nellore	931	867	* 21	* Section V only wanting for 16 villages.
Anantapur		Completed.		
Bellary	1,562	1,537	...	
Cuddapah		Completed.		
Kurnool	789	290	75	
Chingleput	1,767	1,712	17	
North Arcot	1,756	1,608	107	
South Arcot	3,214	2,801	167	
Tanjore	3,661	2,298	...	
Trichinopoly		Completed.		
Madura	2,818	320	160	
Tinnevelly	1,104	1,083	9	
Coimbatore		Completed.		
Salem		Do.		
Nilgiris		Do.		
South Canara		Not required.		
Malabar		Not required.		

The registers have been completed in seven out of the nineteen districts for which they are required. In four they are nearly finished, and in four more their preparation is far advanced. The progress has been very slow in Ganjam, owing to the prevalence of famine; and also in Kurnool, where the preparation of the registers was not commenced for some months under a misapprehension on the part of the local officers that the analysis prepared by Mr. Benson supplied all the information that was wanted. In Madura the work was delayed owing to the progress of settlement operations.

III.—Collection of Revenue and Rental in Precarious Tracts.

11. The revised kistbandi (instalments of revenue), sanctioned in G.O., dated 20th October 1888, No. 724, and referred to in paragraph 11 of the last year's report, was found to be working on the whole very satisfactorily and to be well suited to the conditions of the several districts.

12. Slight modifications were made in four districts, Anantapur, Nellore, Tanjore and Malabar. In Anantapur, the last instalment was put back by one month, that is, from April to March. In Nellore, the two sets of instalments prescribed for the Northern and Southern portions of the district were made to begin from January and February, respectively, instead of from December and January. In Tanjore, a slight reduction was made in the number of instalments from 8 to 7; those for the kar or early crop paddy being fixed at 3, 6 and 7 annas beginning from December, and those for the samba or late paddy crop comprising four instalments of 2, 4, 6 and 4 annas and beginning from February. This change was ordered to take effect from fasli 1300 (1890-91). In Malabar, the four instalments were made equal and put forward by one month, from November to December, by which time the ryots will have realised the value of their first paddy crops.

13. In G.O., dated 7th May 1889, No. 359, Government sanctioned the trial of a scheme proposed by the Postmaster-General enabling land-holders to pay the Government dues by post office money order. The scheme has been introduced experimentally into five districts of the Presidency.

IV.—Measures of Protection.

14. *Communications.*—That portion of the Bellary-Kistna State Railway running from Bezváda to Cumbum was opened during the year and progress was made with the intervening part connecting that portion with the main line at Nandyál. Work on the Villupuram-Dharmavaram Railway was vigorously prosecuted and sanction granted for its extension to Guntakal. A detailed survey for the East Coast Railway from Bezváda northwards was undertaken during the year, and a reconnaissance made for a railway from Nellore northwards.

15. *Irrigation.*—The Rushikulya works in Ganjam and the Periyár Project in Madura were in progress during the year. The amount expended on the former up to end of 1889, was Rs. 12,79,000 and on the latter Rs. 8,77,000 against an estimated outlay of Rs. 28,60,000 and Rs. 56,40,000, respectively. Capital and Revenue accounts have been hitherto kept for only 18 works, of which 10 were classed under major productive works, and the remaining 8 under minor works. Thirteen more works have been added to the list in view to Capital and Revenue accounts being kept for them also.

16. *Minor Irrigation Works.*—The repair of these works has been entrusted to Revenue officers since 1882 and during this period about $24\frac{1}{2}$ lakhs of rupees have been expended towards their improvement. In the year under review, the expenditure amounted to Rs. 3,58,400 or 95 per cent. of the allotment ($3\frac{3}{4}$ lakhs).

17. *Advances to Agriculturists.*—The administration of advances under the Land Improvement and Agriculturists' Loans Acts is at present vested in the Land Revenue Department of the Board of Revenue, and the question of transferring it and the

control of the Minor Irrigation works to this department is now under consideration. The following table shows the amounts of the advances made under the two Acts during the past five years :—

Year.	Land Improvement Loans Act.		Agriculturists' Loans Act.	
	Budget allotment.	Actual loans.	Budget allotment.	Actual loans.
	RS.	RS.	RS.	RS.
1885-86	2,00,000	2,925	..	..
1886-87	2,00,000	8,057	1,00,000	19,100
1887-88	2,00,000	77,507	1,00,000	40,034
1888-89	2,00,000	1,30,622	1,00,000	36,772
1889-90	1,50,000	1,38,690	80,000	44,950

18. *Arts and Industries.*—No further investigations into the conditions of indigenous arts and industries were made during the year, nor did Mr. Havell publish any articles on the subject.

19. *Metals and Minerals.*—Mr. Bosworth Smith's report on the Kolar Gold Fields was published during the year. Of the samples of *Soapstone* alluded to in paragraph 21 of the last report, one obtained from Maddavaram in Kurnool was reported by Mr. F. R. Mallet to be suitable for manufacturing purposes, and an indent for 5 tons 2 cwts. of the same quality was received from the Secretary of State during the year. Arrangements have been made to meet the indent.

20. *Dhobie's earth.*—In the year 1888 the Government having before them the analyses of several samples of this substance submitted by Mr. Hooper, Government Quinologist, directed that an inquiry should be made as to the possibility of successfully establishing an industry in the manufacture of carbonate of soda from it. The results of the inquiry were reported during the year and showed that, although considerable quantities of carbonate of soda could probably be obtained in several districts, there was no prospect of the industry becoming established in them, and the Government did not consider that any expenditure in making experiments on a large scale would be justified to determine whether the manufacture would be successful as a commercial undertaking.

21. *Animal bones.*—The Government of India in its letter to the Madras Government, dated 4th October 1889, No. 67-A—112-1, drew attention to the increasing exports of animal bones and the drain, thereby threatened, of the manurial resources of the country, and desired that information should be furnished in the next annual report of the Agricultural Department, as far as possible, regarding the sources of export of bones, the extent to which bones are collected in the mofussil, their treatment before shipment, with any suggestions for the utilization of bones as manure in this country and a summary of any experiments which have been already made in this direction in previous years. The Board requested all Collectors to report on the points alluded to by the Government of India, and at the same time pointed out that the sea-borne trade statistics showed no increase in the export of bones from this Presidency in recent years, the average annual exports during the last four years, 1886—90, being 2,472 tons, whereas the average exports in the two previous years, 1884—86, were 3,528 tons. This diminution in the exports appeared to be due to the fact that Ceylon, which formerly obtained most of its bone supply from this Presidency, is now getting large supplies from Australia.

22. The reports received from the Collectors show that bones are not generally used as manure except on coffee plantations on the Nílgiris, the Shevaroy hills and in parts of Tinnevelly and Malabar. In the Tanjore district, bone manure is said to be occasionally applied to cocoanut trees, and in South Canara the bones are sometimes buried in their raw state at the foot of indifferent jack and cocoanut trees. The bulk of the bones collected is exported chiefly to Ceylon and, to a small extent, to the United Kingdom. The largest quantity is sent from Tinnevelly and Malabar, about 1,200 tons and 2,000 tons, respectively. Ganjam, Kistna, the Ceded Districts and Kurnool show very small exports, the largest quantity being only about 40 tons from

Cuddapah. Godávari exports from 340 to 430 tons annually, and Vizagapatam from 100 to 250 tons, Nellore following with about 100 tons on an average. Most of the southern districts export about 150 to 200 tons. In Madras, a single dealer has been exporting about 200 tons annually to Ceylon during the last 10 or 15 years.

23. In all parts of the Presidency, bones are collected by chucklers, pariahs and other low-caste men who dispose of the carcases of cattle. The bones of sheep and goats are not collected in some parts, because they are light and do not sufficiently pay the cost of collection. The bones thus collected, are sold in Sea Coast districts to dealers at the rate of about 2 annas per Madras maund, equivalent to about Rs. 11 per ton. The dealers sell the bones in their turn to shippers. On the Nílgiris, raw bones are delivered by contractors at a cost of Rs. 30 to 33 per ton. The cost of bone dust on the Nílgiris varies from Rs. 45 to as much as Rs. 70 per ton, according to situation.

24. The treatment to which the bones are subjected before exportation appears generally to consist in simply drying them and breaking them by hand. In Malabar and to a small extent in South Canara also, however, they are crushed by machinery and converted into meal for use as manure, being generally steamed first.

25. Bones are rendered more active as manure by being mixed with lime, saltpetre, cattle manure, oil-cake or sulphuric acid as well as by disintegration, steaming and reduction to ash.

26. The following is an account of a few experiments made with bones in this Presidency.

In 1880-81, Mr. C. Krishnasami Mudaliar of Shiyáli applied to half an acre of wet land not previously manured 375 lb. of bone ash at the time of transplanting paddy seedlings, the cultivation and irrigation being as usual. An adjoining plot of one acre likewise unmanured previously was cultivated with paddy without any manure. The outturn on the plot manured with bone ash was 720 Madras measures of paddy and 1,260 lb. of straw or 1,440 Madras measures of grain (equal to 3,150 lb.) and 2,520 lb. of straw per acre. The outturn on the unmanured plot of one acre was 828 Madras measures of grain (equal to 1,811 lb.) and 2,352 lb. of straw. The increase in the outturn of grain due to bone ash is thus apparently 1,339 lb. per acre, which is equal to the average outturn of paddy per acre in the whole Presidency.

In April 1888, Mr. Lawson, Government Botanist, mixed with bones coarsely powdered, 10 per cent. of their weight of sulphuric acid and applied the manure (quantity not known) to a plot of cinchona. The bark of the trees thus dealt with was taken twelve months later on, and on being compared with the bark of the trees which had been subjected to ordinary treatment, it was found that the alkaloids exhibited a marked improvement.

On the Saidápet Farm, experiments were several times made with bone-charcoal which, when mixed with oil-cake and decomposed, gave good results. But how far the increase of produce was due to bone-charcoal itself was not definitely determined.

It appears from a report of the Tahsildar of Adóni, that, some years ago at Harpanahalli, bones were broken to pieces, burned, and used as manure with good results ; but the ryots do not care to use bones as manure since the above-mentioned process of preparing them is laborious. In the Chingleput district, the zemindar of Vangul tried bones as manure, but it appears that he had not much success.

Mr. Gray, a Coffee planter on the Nílgiris, says that he has found by experience that an application of 5 cwts. of bones to an acre gives on an average an increased crop of 2 cwts. of coffee.

In the sugar factories at Aska, Nellikuppam, and Tuticorin, considerable quantities of bones are consumed as bone-charcoal.

V.—Agricultural Experiments.

27. *Farms.*—The Madura Farm still continues to exist, but no longer receives any aid from the department. No direct farming operations of any sort were carried on by the department during the year.

28. *Tobacco experiments.*—The reports obtained locally on the tobacco cured by Mr. Caine in the season of 1888-89 showed that the results were far from successful, some of the leaf having been cut too late and some too early. Samples of leaf were

sent to England for the opinion of experts which has since been received. The reports of the home brokers and manufacturers showed some remarkable difference of opinion as to the value and quality of the samples sent, but they were on the whole unfavorable. It was thought, however, that the samples exhibited a very decided improvement in growth and curing over previous samples sent from India, and the Secretary of State for India considered that the reports seemed to afford encouragement to the efforts which were being made to improve the cultivation of tobacco in the Presidency.

It was proposed during the year under report to commence a series of experiments in the Godávari district in the curing of Lunkah leaf as pipe tobacco, and in order to set Mr. Caine free at Vedasandur, an Agricultural Inspector was deputed to work under him there to learn the routine, it being thought that Mr. Caine would then be able to go to Godávari in February last. From various causes, however, the planting in the season of 1889-90 was late, and as it was found that Mr. Caine could not safely leave Vedasandur before March, the proposed experiments in Godávari were abandoned, and Mr. Caine's efforts were concentrated at Vedasandur. The results of the further experiments conducted there have been found to be most disappointing. About 2 acres were planted with the Sumatra, Havanna, and two of the indigenous, varieties and the tobacco after being cut was cured in closed sheds under Mr. Caine's personal supervision. Samples of the cured leaf were sent to four of the local firms, three of which have favored the Board with their opinion which is almost uniformly unfavorable. The leaf of the Sumatra and big Havanna is stated by Mr. Heimpel to be "coarse, thick and of low quality," and by Messrs. McDowell and Co. "to be not useful as a covering leaf, being extremley thick;" they add that its smell is scarcely perceptible and that it smokes with a black ash. Messrs. Spencer and Co. state regarding the same leaf that it does not burn well, is not suitable for cigar wrappers and has not sufficient flavor for fillers. No estimate is given of its market value by Messrs. Spencer and Co. Messrs. McDowell and Co. appraise it at from Rs. 6 to Rs. 10 per maund, but Mr. Heimpel gives no market value either for the Sumatra or for the indigenous tobacco on the ground that the leaf is of too low a character for cigar and unfit for the work done in the firm. Mr. Caine's own opinion indeed of the Sumatra tobacco fully bears out the above estimates. The big Havanna should, he thinks, be acclimatized as the leaf grown was of good texture and color though he adds that the leaf does not burn and possesses but little value on that account. The texture, quality and flavor of the indigenous leaf grown by Mr. Caine are, Mr. Heimpel states, "much below the classes of tobacco grown by the firm in that district though it shows an improvement." Messrs. Spencer and Co. are of opinion that the color of the leaf is good as an outside covering wrapper though they considered that in flavor it is "decidedly wanting owing to insufficient fermentation." Messrs. McDowell and Co. find the flavor "not pleasant."

The total weight of the tobacco after curing was 2,880½ lb., of which 1,442 lb. were indigenous tobacco, 1,027 lb. Sumatra, 314½ Big Havanna and 97 the Small Havanna. Excluding 23¾ lb. sent as samples to different firms for opinion, 1,418¼ lb. of indigenous tobacco were sold for Rs. 158-8-3, though Mr. Caine estimated the value of his crop at Rs. 150 per pothi of 320 lb. The whole of the foreign tobacco, 1,409 lb., exclusive of 29½ lb. distributed as samples, was also sold on the recommendation of Mr. Caine as it would not keep. It realized Rs. 35-5-3 only.

29. *Cotton enquiry.*—Acting on a suggestion made by Mr. Nicholson in his note laid before the Agricultural Committee, an enquiry was set on foot during the year to determine why the outturn of cotton in Tinnevelly is so much lower than that obtained in America. The district was chosen because it is one of the largest cotton-producing areas in the Presidency and the cotton grown there commands a higher price than that produced in any other part of this Presidency. The enquiry during the year has been chiefly directed to ascertaining and recording in full detail the conditions under which the crop is now grown with a view to determining any direction in which experiment as to improvement may be possible. An Agricultural Inspector was detailed for this work in July 1889, and was engaged for 10 months at Sátúr in collecting information of the nature referred to in several selected villages.

30. The results of the inquiry are on the whole satisfactory. They show—

(1) That the growth of cotton in Tinnevelly under the influence of recent high prices is a very profitable undertaking. The price of uncleaned cotton was once, the Inspector says, so low as Rs. 7 per Pothi of 320 lb., and it has now increased three or four fold. This increase in the price has acted as a stimulus not only to extend the area under cotton, but also to increase the outturn per acre.

(2) That the yield is very satisfactory and the quality of the cotton superior. The average yield of clean lint per acre is said to be about 125 lb., which compares not unfavorably with the average yield of the United States which is given in the Tenth United States Census Report (Cotton) at 189 lb. per acre, varying in the three typical Cotton States of Georgia, North Carolina and Arkansas from 148 lb. to 277 lb. The seasons during which the inquiry was conducted were, however, very favorable for cotton.

(3) That there has been no falling off in the outturn of late years, but rather the contrary. The ryots themselves admit that the outturn of cotton is somewhat larger now than it was formerly. The increase in the outturn is attributed by the Agricultural Inspector (1) to the recent practice of adding various kinds of earthy matter to manure heaps which are thereby not only increased in quantity, but also become better decomposed, and (2) to the greater care and attention now bestowed in tilling the lands and clearing them of weeds.

There are but few lines suggested for experiment by the Agricultural Inspector's report, by which it might be hoped that the outturn could be further increased. In an important point, however, viz., in selection of seed, sufficient attention does not appear to be paid at present. Some improvement seems also possible in regard to sowing and weeding. Except in these respects, the report indicates that the Tinnevelly cotton soil ryot is far more advanced than most of his compeers in the Ceded Districts and Kurnool.

31. In order to collect and tabulate the information available in the country as to the quality of the different cottons produced in the Presidency, a circular was addressed early in the year to the principal firms and merchants engaged in the cotton trade propounding a series of questions bearing on the subject. Their replies have been received and after being collated with the information available in the Board's records, have been published in the form of a bulletin (No. 9) as a first step towards more detailed investigation of the nature of that commenced in Tinnevelly. Attention having been drawn to the great development of the cotton-seed oil industry in the United States of late years, endeavours were made during the year to obtain data as to the possibility of such an enterprise being started in India, but without success. The question appears to be one well worthy of scientific enquiry and experiment, for the amount of cotton-seed produced annually is very large, and cotton-seed oil is highly valued in Europe and America.

32. At the request of a private individual 3 cwts. of cotton-seed were obtained from Egypt by the assistance of the Chamber of Commerce, Bombay, for experimental sowing on the Permedi hills of Travancore.

33. The postponed award of prizes for crops of barley raised on the Nílgiris from the seed imported by Government in 1888 was made during the year, but it was found necessary to give up the idea of making the award on a system of field competitions as originally intended. The prizes were awarded to specimens of the grain received for weight, color and uniformity, and for careful harvesting. The grain has been found to malt very well and though the outturn of the plots which produced the prize-winning samples was in no case high, the results were fairly satisfactory. The Government prizes were supplemented by grants from the brewing companies working on the hills. The system of giving prizes for samples is to be continued.

34. The seed-oats referred to in paragraph 29 of the last report having arrived on the hills too late for the last season's sowings, became damaged by keeping and the results of the sowings in the season of 1890 were anything but satisfactory. The growth of oats for green fodder is, however, an established industry on the hills, and further experiments appear to be uncalled for in the matter.

35. *Eucalyptus.*—The reports on the experiments made with the seeds of a number of varieties of *Eucalyptus* imported in 1888 which were received during the year were

not very satisfactory or encouraging. In a few places, by the exercise of special care, a few plants have been reared, which grow slowly and poorly, but the general result has been to show that in the plains these plants, although the seed may germinate freely, rot off very soon and but few can be reared, and probably the belief of the Conservator of Forests, Northern Circle, that it is of little use to attempt to acclimatise them is fully justified; at any rate these arboricultural experiments may well be left to the Forest Department in future.

36. *Erythroxylon Coca.*—The reports received during the year show that the plants distributed in 1888-89 have for the most part done well except in Ganjam and Vizagapatam, and the experiment, as far as it has yet gone, shows that it is possible to propagate this valuable plant, if reasonable care be taken of it under the conditions specified last year. It is, however, too early as yet to state what the value of the leaf produced under the conditions met with in this Presidency will be. This point is being investigated.

37. *Salt bush.*—Enquiries instituted during the year as to the natural habitat of the Australian salt bush, which it was once hoped might be usefully introduced as a fodder plant to be raised in the marshy saline land found in the coast districts, revealed the fact that the natural habitat of this plant is an arid desert country. Further investigations as to whether any plants could be found in this country which correspond in their character to the Australian salt bush, showed that although there is a considerable number which flourish in saline marshes and similar localities, there are none that correspond in their habits and character with it.

38. *Sugar and Jaggery.*—A suggestion that the Government, with a view to improving the quality of sugar produced in India, should start large model factories for the manufacture of "modern sugar" was received from the Government of India during the year for report, but it was pointed out that in most localities the conditions met with rendered the idea impracticable, and that if there was really an opening for the enterprise, it would be embarked in at once by the commercial community. In connection with this discussion a most interesting and valuable communication was received later from Mr. Francis M. G. Gill giving actual data as to the quality of the jaggery produced in Southern India and the composition of the canes from which it is produced, which go to show that much of the inferiority of the jaggery at present turned out is due either to the ryots growing poor varieties of sugarcane, or from their cutting the cane when it is not fully ripe.

Reports received during the year indicate that in Vizagapatam the sugarcane industry is declining as the quality of the jaggery is falling off owing to careless manufacture and adulteration. These might both be guarded against by a little more care and honesty than is now shown in the manufacture, and the attention of growers has been drawn to the fact.

39. *Economic Entomology.*—No opportunities occurred during the year to enable the gentlemen who undertook to make experiments in the use of London purple as an insecticide to utilize the supply sent to them during the year, there having been a very marked absence of serious insect attacks. Locusts, however, appeared to a very small extent in Godávari and Vizagapatam and have done some damage there. Those which appeared in Vizagapatam have been identified as the *Acridium peregrinum.* Specimens of the locusts which appeared in Godávari were sent to the Superintendent, Government Central Museum, for identification.

Specimens of the locusts which appeared in the Presidency in 1878-79 were sent by Dr. Thurston to Mr. Cotes of the Indian Museum for identification and that officer reports that the specimens consist of six different species, and that they were forwarded to Dr. Henri de Saussure who determined them as follows:—

(1) Acridium æruginosum.
(2) Acridium melanocorne *var.*
(3) Tryxalis turrita.
(4) Mecopoda sp—.
(5) Euprepocnemis sp—and
(6) Pachytylus migratorius ?

The last-named species could not be identified with certainty, as it was represented by a single dilapidated specimen. Mr. Cotes has asked the Superintendent, Central Museum, for a sufficient number of specimens of the last-named species, to enable him to identify it. He believes that *Pachytylus migratorius* is almost entirely

confined to the Polœarctic Zone. Of the locusts which appeared in 1878, it appears that there was one migratory species which came in vast flight and did most of the injury, the other non-migratory species being very much smaller in number though helping to a greater or less extent in the work of destruction. The first five species above mentioned were non-migratory.

40. *Sericulture.*—The investigations of the special officer appointed to organize the collection of cocoons of the tassah silk moth in the Chingleput district were brought to an end in June 1889. Owing to a misconception of the instructions issued by the department, he was not properly directed to his work and it was only in March 1889 that he commenced the collection of cocoons. The report submitted did nothing to show the cost of collecting such cocoons, the chief point that it was desired to clear up. It contained, however, a large amount of valuable information regarding the habits of the tassah silk worm and regarding its natural enemies, and may form a basis for future useful work. The Government has since decided that an attempt should be made to rear tassah silk worms, and has transferred further operations in this direction to the Forest Department.

41. *Exhibitions.*—The fourth show of the series held in recent years in that locality was opened at Bellary on the 18th December 1889. It was organized on much the same lines as those of the previous years, but the prize list had been recast. As a whole the show was not successful; there was a falling off in the number of exhibits from 1,049 in the previous year to 861, the decrease being most marked amongst live stock—from 362 to 185; and there was a decrease in the proportion of the amount granted as prizes from 70 to 58 per cent. The total cost of the show was Rs. 4,037-9-0, of which nearly 67 per cent. was awarded in prizes. A similar show was also held at Salem in February last, which though more successful was not altogether satisfactory. There also there was a decrease in the number of live stock exhibited. At this show the proportion of the money offered in prizes that was awarded was 59·5 per cent. against 81 per cent. at the previous show. It cost Rs. 5,934-6-0, of which 66 per cent. was allotted in prizes. The system of mofussil shows, of which these two are the latest, has been practically abandoned pending the orders of Government on the Agricultural Committee's report. The want of much success at them, and the absence of any genuine interest amongst the ryots in them shows that the system needs revision.

42. *Agricultural implements.*—During the year the department sent out no parties to exhibit implements in the mofussil, but Messrs. Massey and Co. organized a party which visited South Arcot, Trichinopoly, and Coimbatore, exhibiting ploughs and sugarcane mills at work and repairing and renewing the wearing parts of previously sold implements when produced. The demonstrations, Messrs. Massey and Co. say, were not a success, as the ryots were unwilling to buy efficient ploughs costing more than Rs. 4 or 5 nor efficient sugarcane mills costing more than Rs. 100 each. From the fact, however, that Messrs. Massey and Co. received numerous orders for spare shares and that many former purchasers of ploughs visited their works and bought ploughs for extended operations, it is believed that a good number of improved ploughs are in actual work. The demand is usually for Cotton-soil ploughs, E. P. plough, and Climax plough, the latter apparently suiting the requirements of the ryots owning small cattle. Messrs. Massey and Co. report that they have now invented a steel share tip whereby the cost of shares is considerably reduced. The share tip is said to be appreciated by the ryots, to be durable, and capable of being easily secured to the original share.

43. During a visit to the Bellary district, the Assistant Director made enquiries as to the manner in which the Cotton-soil ploughs made by Messrs. Massey and Co. did the work for which they are designed and reports that except for a few minor defects, which it is believed have since been corrected, the ploughs work to the satisfaction of the ryots, and are found to effect a great saving of labor over that required for the *pedda madaka* or large native plough heretofore used. Messrs. Massey and Co. are believed to have sold a considerable number of these ploughs in the Anantapur and Bellary districts.

44. The deferred trial for the award of the prize of Rs. 200 offered by the Government in 1888 for the best water-lift was held at Vellore in August last, when only two lifts competed, although there had been six entries for the prize. One of these was submitted to a prolonged trial, but the judges at length came to the conclusion that it did

not fulfil the conditions prescribed by the Government. At the Salem exhibition held in February last a new water-lift was brought out, but it is complicated and has yet to be thoroughly tested before it can be pronounced upon. A similar remark may be made as regards a lift designed by Mr. C. K. Subba Row, Sub-Assistant Director, intended to supersede the working Single Mhote.

45. At the Bellary exhibition some Cream Separators were shown by a party sent out by the Dairy Supply Company, London. This display was repeated in Madras with the assistance of the department, but it does not appear that these demonstrations led to any business being done. The machines appear to be unsuited to the conditions under which the milk supply of towns is at present carried on in this part of India.

46. *Economic products.*—Specimens of the silk cotton obtained from the *Bombax Malabaricum* were forwarded from nineteen districts to the Indian Museum during the year at the requisition of the Government of India, as well as samples of cocoanut coir, and of the materials made from it from three districts and from Travancore; samples of grass and sedge mats and the fibres used for making them from four districts; of Sunn hemp (the fibre of the *Crotalaria juncea*) from three districts; and single specimens of fibres prepared from the *Calatropis gigantea*, the *Yucca gloriosa* and of khaskas (*Andropogom muricata*). These specimens were indented for to meet the requirements of the Secretary of State and for the Imperial Institute.

47. Detailed information was forwarded during the year to the Government of India regarding a variety of economic products for the use of the Economic Reporter.

48. At the suggestion of a firm engaged in brush manufacture in England, samples of several fibres believed to be likely to be of use to the trade were forwarded during the year to Mr. W. R. Robertson who brought the matter to notice, but as yet nothing further has been heard regarding them. Similarly at the request of a firm of Horticulturists several samples of tobacco obtained from Cuddapah and Kistna were forwarded to them for experiment as they considered that this might enable them to determine whether such tobacco could be turned to account in their business.

49. At the request of the Consul-General in Calcutta for the United States, specimens of forty-four varieties of sorghum (cholum) seed were collected from the Kistna, Kurnool, Coimbatore and Madura districts and forwarded to him during the year for transmission to America for experimental purposes. These samples embraced varieties of the red, black, yellow and white cholums grown in the districts referred to.

50. *Agricultural Proverbs.*—In order to supplement the collection of proverbs bearing on matters connected with agriculture which was made by Mr. Benson during the preparation of his account of the Kurnool district, the Board, in September 1888, issued a list of those embodied in the account to all Collectors with a request that similar collections might be made for every district. During the year a large number of collections were received which have since been collated and arranged and will shortly be published with notes and explanations.

51. *Societies.*—At the instance of the Government of India, the Director has been appointed an *ex-officio* member of the Managing Committee of the Madras Agri-Horticultural Society. The Society note the propagation of a few plants of economic value, but otherwise there is nothing calling for special notice in this report. The contribution of Government to their support was Rs. 4,000.

A report was received during the year stating that an Agricultural Society for the collection of information and for carrying out experiments had been formed at Sátúr in Tinnevelly.

VI.—Cattle Breeding and Veterinary Establishment.

52. *Cattle.*—An inquiry was made by the Assistant Director and the Inspector of Cattle Diseases during the year to determine the chief cattle-breeding grounds in the Presidency. The inquiry extended to all parts of the Presidency lying to the south of the Kistna, except the West Coast, and the results, with a brief description of the different breeds of cattle met with, have been published in the form of a separate Bulletin (No. 8).

53. *Fodders.*—A very useful series of analyses of South Indian fodders made by Dr. Van Geyzel, Chemical Examiner, was published during the year, together with a

note on the results shown therein. Owing to the time and trouble involved and to the pressure of other work on the Chemical Examiner, it was not considered advisable to ask that officer to carry on this investigation further, and the matter has been allowed to stand over.

An interesting report was received early in the year from the Sub-Assistant Director regarding the practice which prevails in the Tinnevelly district of growing cholum for fodder, in the course of which he made several suggestions for the development of the practice. It was decided, however, to defer any action thereon pending the issue of the orders of Government on the report of the Agricultural Committee.

54. *Ensilage.*—Experiments in making this were carried out in the Kistna, Trichinopoly, Tanjore and Tinnevelly districts during 1889. In Kistna the results were fairly successful and the cattle fed on the silage throve. In Trichinopoly also fair results were obtained, the silage being good and readily eaten, but in Tanjore the result was not satisfactory, the persons who tried the silage not approving of it. In the Tinnevelly experiment, there was great loss from damaged silage, but the good silage was appreciated. The experiments failed, however, to clear up any of the moot-points connected with the question whether the practice of making silage is economical in Southern India.

55. *Pony-breeding.*—At the beginning of the year six stallions were stationed in Coimbatore, one on the Nílgiris and three in Salem. One of the first lot was sold during the year as being unfit for work. The stallion at first stationed on the Nílgiris was transferred to Coimbatore and replaced by a smaller one. During the year 305 mares were covered in Coimbatore, 14 on the Nílgiris and 115 in Salem, giving an increase of 54 mares covered as compared with the number covered in the previous year. There was, however, a serious falling off in Salem owing to the unfavorable character of the season, and very poor work was done on the Nílgiris.

The results of the coverings made in 1888 were reported during the year and showed that out of 375 coverings, the results were determinable in only 323 cases, of which only 86 or 26·6 per cent. were successful, a proportion slightly better than in the previous year, when only 70 out of 269 coverings, the results of which were known, were successful, a proportion of 26·02 per cent. The average number of foals per stallion was 8. The general average of produce foaled to mares covered by the stallions of the Government Horse-breeding Department in Bengal and Bombay and the number of produce foaled per stallion employed during the three years ending 1888-89, the latest for which information is available, are shown below:—

Year.	Average foaled to mares covered.		Number of produce foaled per stallion employed.	
	Bengal.	Bombay.	Bengal.	Bombay.
1886-87	34·44	34·55	12·67	10·41
1887-88	30·26	37·42	11·26	11·72
1888-89	31·05	37·32	10·75	13·78

The Madras results compare unfavorably with these. Recent inquiries, however, which have been made in Coimbatore showed that in the case of one stallion the actual results were better than first reported, no sufficient inquiry having been made in some cases before the results were reported. Care will be taken that this error is not repeated. The stallions are all well cared for and are in excellent condition, and it is hoped that future years with more careful registration will show better results.

56. Castration of country tats was carried on in Salem, Coimbatore and the Nílgiris, the total number castrated being in Salem 134, in Coimbatore 95, and on the Nílgiris 25. In the Nílgiris it was found that the work made no progress and it has now been abandoned there.

57. *Cattle disease.*—Mr. E. H. Hazelton, A.V.D., was throughout the year in charge of the operations of the department devoted to the prevention of cattle disease. His report is appended and is noticed more fully below. The Sub-Assistant Director

worked under his orders from the beginning of the year till February, when he proceeded on privilege leave. He had working under him at the beginning of the year 16 Stock Inspectors and 5 Probationers, and at the end of it 17 Stock Inspectors. Cattle disease, though happily of a much less severe type than that met with during the two previous years, prevailed to a greater or less extent in all parts of the Presidency, those districts which are reported to have suffered most severely being Ganjam, Kistna, Kurnool, Cuddapah, North Arcot, Chingleput, South Arcot and Malabar. Statements are given in the appendix showing the mortality both for the whole Presidency and districtwar, for each class of stock, as well as diagrams illustrating the mortality of horned cattle.

58. The following is an abstract of the losses recorded for the whole Presidency during the past 3 years for all descriptions of stock :—

Causes of death.	Mortality during the years ending 31st March amongst								
	Cattle.			Sheep and goats.			Horses and ponies.		
	1887-88.	1888-89.	1889-90.	1887-88.	1888-89.	1889-90.	1887-88.	1888-89.	1889-90.
Diseases.									
Rinderpest	116,558	95,795	38,252	5,180	4,075	4,492	..	..	..
Diarrhœa and dysentery	3,966	47,946	30,368	959	4,363	5,040	2	5	6
Total ..	120,524	143,741	68,620	6,139	8,438	9,532	..	..	..
Anthrax	34,432	19,893	22,502	1,816	3,253	5,654	3	5	9
Foot-and-mouth ..	2,763	5,260	7,811	211	989	2,836	..	..	..
Variola	733	2,841	3,290	3,373	7,387	7,962	..	1	4
All others	15,771	24,529	26,243	5,430	9,212	13,615	34	88	134
Total ..	174,223	196,264	128,466	16,969	29,279	39,599	39	99	153
Other causes.									
Natural decay ..	33,535	129,471	163,848	5,851	30,174	40,699	11	256	484
Accidents	45,857	9,072	22,114	20,106	11,608	11,815	59	68	66
Snake-bites	1,824	2,587	2,895	78	241	329	2	11	10
Wild animals	7,591	9,520	10,517	3,609	7,364	9,050	29	96	130
Poisoning	44	22	15	..	..	2	..	..	..
Total ..	88,851	150,672	199,389	29,644	49,387	61,895	101	431	690
Grand Total ..	263,074	346,936	327,855	46,613	78,666	101,494	140	530	843

It may be safely asserted that to improved registration is due a great deal of the increase under sheep and goats and ponies and horses, whilst the falling off under the head of "cattle" would probably have been greater but for the same reason. The latter decrease is very marked and very satisfactory; but notwithstanding, the total loss to the ryot community during the year from disease mostly preventible on the usual lines of calculation was not less than 13¼ lakhs of rupees. The decreased loss compared with the previous year was nearly 6¾ lakhs.

Taking the live-stock of the Presidency to be in round numbers 13,700,000 horned cattle, 11,400,000 sheep and goats and 40,000 horses and ponies, the rate of mortality per mille reported during the year was—

—	From disease.		From natural causes.		From all causes.	
	1888-89.	1889-90.	1888-89.	1889-90.	1888-89.	1889-90.
Horned cattle	14·0	9·3	11·3	14·6	25·3	23·9
Sheep and goats	2·6	3·5	4·3	5·4	6·9	8·9
Horses and ponies	2·5	3·8	10·7	17·5	13·2	21·3

These figures for the reasons pointed out last year show that the mortality as reported to the department is enormously under-stated. They also appear to show that there

has been an improvement in the registration, the death-rate from natural causes having risen amongst cattle from 11·3 to 14·6 per mille, amongst sheep and goats from 4·3 to 5·4, and amongst horses and ponies from 10·7 to 17·5. The deaths reported to the department do not include those of animals slaughtered for food, a fact which may in part account for the lower death-rate amongst sheep and goats. An inspection of the districtwar figures appears to show that registration is particularly bad in Nellore, Cuddapah, South Arcot, Madura, Coimbatore, and most of all in Salem.

59. As noted in the last report, disease, and especially rinderpest, which had been most destructive for about two years, was showing a considerable decrease towards the end of the previous year. This decrease continued almost uninterruptedly in the past year from April to July, after which there was at first a gradually and then a considerably increased mortality until the maximum for the year was reached in October. From October onwards, the mortality of cattle from disease fell off rapidly until in February and March it only slightly exceeded 8,000 head a month, a figure lower than it had ever been since July 1887, when a monthly death-rate of over 10,000 was first reached. If allowance be made for presumably increased accuracy of registration, the falling off in mortality is very marked and satisfactory. The mortality from rinderpest followed almost the same fluctuations and never reached the appalling numbers of the previous 18 months. It will be noticed however that the number of deaths attributed to rinderpest, diarrhœa and dysentery taken together has not during the year under reference borne nearly so large a proportion to the total number of deaths as in the previous years, having fallen from about 70 to a little over 50 per cent. of the total. As compared with the returns for 1888-89, there was a most marked increase under foot-and-mouth disease and under diseases unspecified which bear to the latter nearly double the proportion they did to the total in the former year, whilst both anthrax and variola showed not only a relatively, but also an actually increased destructiveness. Part of this may be due to inaccuracy of reporting actual deaths from rinderpest being attributable to some other cause owing to a desire on the part of village officers to avoid drawing attention to their villages and thus incurring the risk of visits from the Stock Inspectors. Whilst therefore the cattle plague has shown decreased destructiveness, the number of deaths from other diseases has considerably increased.

The districts which have suffered most from rinderpest, diarrhœa and dysentery (taken together) are Kistna, Kurnool, North Arcot, South Arcot and Malabar. It is only in these districts that the mortality from these causes amongst cattle reached or exceeded 5,000 head; whilst in Cuddapah, Chingleput, Trichinopoly, Tanjore and Madura it reached 3,000 head per district. The great contrast in the losses from these causes is very clearly shown in diagram No. 2.

Anthrax is reported to have carried off 4,440 head of cattle in North Arcot, but in no other district did the mortality from this cause exceed 2,500, that figure being reached in Kistna, but nearly 2,400 cases were reported from South Arcot and about 2,200 from both Cuddapah and Chingleput. Tanjore reported nearly 1,900 deaths, and Anantapur, Kurnool and Ganjam each between 1,000 and 1,500 from this disease, but elsewhere it caused but few deaths. It was most destructive from June to October, or very much earlier in the year under notice than in 1888-89, whilst towards the end of the year the mortality fell away to a very low figure.

Foot-and-mouth disease is reported to have caused a very large number of deaths amongst cattle in Ganjam (2,393) and a considerable number in Trichinopoly (1,013); these two districts account for nearly half of the mortality reported from this disease throughout the Presidency. The disease seems also to have prevailed to a considerable degree in Nellore, Cuddapah and Anantapur, in North Arcot, Chingleput, South Arcot and Tanjore, in Tinnevelly and on the Western Coast, whilst no district escaped from it.

Variola is reported to have caused a remarkably large (1,267) number of deaths in Vizagapatam and a considerable number in Coimbatore, Cuddapah and Madura, and Ganjam, Godavári, Chingleput, South Arcot and Nílgiris escaped entirely from this disease and North Arcot and Tanjore very nearly so.

Unspecified diseases are reported most largely from Ganjam, Vizagapatam, Godávari and Kistna, whilst all districts, except North Arcot, Tanjore, Madura, Tinnevelly, Nílgiris and the West Coast, show considerable mortality under this heading.

60. Taken altogether the reported death-rate amongst horned cattle from disease only amounted to 9·3 per mille for the whole Presidency, that is, nearly 5 per mille less than in the previous year. The proportionate loss was however much greater in some than in other districts. Ganjam and Vizagapatam with 33 and 35 per mille show by far the heaviest proportionate loss and next to them come Kurnool (21), Chingleput (19), North Arcot (17), and then much lower down Kistna (11), Nellore, Anantapur and South Arcot (10), and Cuddapah and Trichinopoly (9). In the other districts the proportionate reported loss was small and in Salem and Godávari remarkably so.

61. The number of deaths reported amongst sheep and goats from disease has been rising rapidly during the three years referred to in the table given at paragraph 58, but it may be safely asserted that a great deal of this increase is due solely to improved registration. The losses from disease were heavy in the opening month of the year, but from May to September averaged about 2,000 a month only, in October and November the loss was doubled and trebled and during the remaining months was at a rate about 50 per cent. above that figure. During November some heavy losses from anthrax, chiefly in Godávari, Bellary and North Arcot, and from foot-and-mouth diseases, chiefly in Godávari, raised the death-rate, but in the whole year rather more than one-third of the loss was reported as due to unspecified diseases. The districts which showed the largest mortality were Anantapur, chiefly from sheep-pox, Bellary, chiefly from anthrax, and Cuddapah, chiefly from the above two causes combined, and Vizagapatam where also sheep-pox was very fatal. On the whole the last-named disease was by far the most destructive, with anthrax standing next. Diarrhœa and dysentery caused nearly as many deaths as anthrax and rinderpest. A few districts escaped disease almost entirely, viz., Tanjore, Salem, Nílgiris and the Western Coast, and in none, except Vizagapatam, was the death-rate per mille from disease high. It however appears that in both Ganjam and Vizagapatam there were great losses of stock (cattle and sheep) from disease. Much of this may no doubt be attributed to the reduced condition of the stock owing to the previous unfavorable season.

62. The mortality from disease reported amongst horses and ponies, although it showed a marked increase on that of the preceding year, was in reality altogether trifling and scarcely needs comment.

63. Nothing perhaps shows more clearly how much the registration of cattle mortality has improved in recent years than the great increase that there has been in the reported mortality of all descriptions of stock from causes other than disease. This has chiefly occurred under the sub-head "natural decay," for it is evident that in the first of the three years referred to in paragraph 58 many of those put down to "accidents" were erroneously classified. The mortality from snake-bites shows a slight increase in each year, as also does that from the ravages of wild beasts. The number of deaths caused by "accidents" during the past year is greatly increased by the losses which occurred in Ganjam during November owing to exposure during a cyclone, in which about 13,100 cattle and 5,900 sheep and goats perished. The mortality reported from "natural decay," although it reaches the high figures of 163,848 cattle, 40,699 sheep and goats, is not, in proportion to the number of stock known to exist in the Presidency, anything but extremely small. It only amounts to 12 per mille amongst the cattle and 3·5 per mille amongst the sheep and goats, whilst a reference to the detailed tables in the appendix shows that the report under this sub-head is extremely bad in some districts, *e.g.*, Salem (pre-eminently), Coimbatore, South Arcot, Cuddapah, Madura and Nellore, whilst in almost all there is evidently much yet to be done before even fairly accurate figures of the actual mortality amongst live-stock are forthcoming. These statistics take no note of the number of animals slaughtered at sacrifices or for human consumption.

64. During the year only 15 deaths of cattle from animal poisoning were reported against 22 in the preceding year—5 in Cuddapah, 2 in Madura, 3 in Bellary, 2 in Nellore, and 1 each in Vizagapatam, Anantapur and Tanjore.

In Vizagapatam, the offenders were sentenced to three months' rigorous imprisonment and a fine of Rs. 10 each. In Nellore, the offenders were not convicted for want of evidence. In Anantapur, the culprit was sentenced to four months' rigorous imprisonment. In Cuddapah, Bellary, Tanjore and Madura, it was suspected that the animals had been poisoned, but there was no evidence to prove it.

Among sheep and goats, there were only two deaths from animal poisoning reported from Anantapur, but what action was taken in the matter has not been stated by the Collector.

Part VII.—Miscellaneous Statistics.

65. *Rail-borne trade.*—The total trade registered during the year 1889-90 amounted to over 31¾ millions Indian maunds or nearly 2½ millions (8·4 per cent.) more than the trade of the previous year, as shown below :—

——	1888-89.	1889-90.	Difference.	Percentage of increase or decrease.
	I. MDS.	I. MDS.	I. MDS.	
External trade—				
Imports into the Presidency	2,919,492	3,782,640	+ 863,148	+ 29·56
Exports from do.	3,684,020	4,311,465	+ 627,445	+ 17·03
Total ..	6,603,512	8,094,105	+ 1,490,593	+ 22·57
Internal trade	22,772,730	23,752,021	+ 979,291	+ 4·30
Grand Total ..	29,376,242	31,846,126	+ 2,469,884	+ 8·41

66. *The external trade.*—The trade of this Presidency with the other British Provinces and Native States was, as usual, chiefly confined to Mysore, Bombay and the Nizam's Territory as shown below :—

External blocks.	Imports, Percentage.	Exports, Percentage.
Mysore	63·30	66·27
Bombay	10·66	9·30
Nizam's Territory	18·45	23·98
Other blocks	7·59	·45
Total ...	100·00	100·00

The principal articles of import were grain and pulse, chiefly from Mysore (1,865,195 maunds); hides and skins (324,593 maunds); provisions (260,360 maunds); oil-seeds (397,575 maunds); dyes and tans (127,889 maunds); raw cotton (137,767 maunds) and sugar (155,109 maunds). The exports which were principally from the Madras Port consisted mainly of grain and pulse (879,250 maunds); salt (387,912 maunds); provisions (282,440 maunds); metals (152,890 maunds); sugar (139,649 maunds); coal and coke (383,124 maunds) and manufactured cotton (120,624 maunds).

67. The variations as compared with the trade of the previous year under some of the more important articles are shown below :—

Articles.	1888-89.	1889-90.	Difference.	Percentage.
	MDS.	MDS.	MDS.	MDS.
Imports.				
Grain and Pulse	1,270,397	1,865,195	+ 594,798	+ 46·82
Oil-seeds	223,639	397,575	+ 173,936	+ 77·77
Provisions	311,553	260,360	— 41,193	— 13·66
Spices	80,474	88,664	+ 8,190	+ 10·18
Sugar	108,444	155,109	+ 46,665	+ 43·03
Hides and Skins	331,529	324,593	— 6,936	— 2·09
Exports.				
Grain and Pulse	786,021	879,250	+ 93,229	+ 11·86
Provisions	243,782	282,440	+ 38,658	+ 15·86
Oil-seeds	70,060	99,998	+ 29,938	+ 42·73
Spices	46,714	69,772	+ 23,058	+ 49·36
Raw cotton	23,790	44,024	+ 20,234	+ 85·05
Coal and Coke	132,401	383,124	+ 250,723	+ 189·37
Metals	200,439	152,890	— 47,549	— 23·72
Oils	55,574	56,909	+ 1,335	+ 2·40
Sugar	172,920	139,649	— 33,271	— 19·25

68. *Internal trade.*—The trade within the Presidency was chiefly in grain and pulse which contributed 25·75 per cent. of the total trade. The percentages contributed by other principal articles were stone and lime 10·53, oil-seeds 10·25, salt 10·37, provisions 6·20 and sugar 5·76.

Road-borne trade.

69. *Interprovincial traffic.*—Under this head, the trade of this Presidency with the Central Provinces was registered at Kalingiyá. The long distance traffic or the traffic passing over a distance of 10 miles and upwards registered at this station was as follows :—

Registering station.	Inwards.			Outwards.		
	Goods.	Passengers.	Animals.	Goods.	Passengers.	Animals.
	I. MDS.	NO.	NO.	I. MDS.	NO.	NO.
Kalingiyá	97,285	1,833	754	28,425	2,290	15
Total ..	97,285	1,833	754	28,425	2,290	15

70. *Internal or Local trade.*—The following statement shows the lines of communication taken up for registration during the year under report and the long distance traffic registered on those lines :—

Internal or Local Trade, 1889-90.

Road.	Stations.	Goods.	Passengers.	Animals.
		I. MDS.	NO.	NO.
Road No. 1 (*b*), the trunk road from the limits of the Senior Assistant Collector's charge in Ganjam to Chicacole.	(1) Pundi	787,969	314,966	2,061
	(2) Naupada	221,616	24,388	595
	(3) Narasannapet ..	596,988	323,556	..
Road No. 4.—Trunk road from Chicacole to the junction of the Vizianagrum-Bimlipatam road.	(1) Natavalsa	377,369	163,829	12,423
Road No. 5.—Vizianagrum to Vizagapatam	(1) Chittivalsa	1,240,189	174,670	8,065
	(2) Boddavalsa	1,348,688	197,950	9,323
	(3) Vemalavalsa	1,005,747	223,393	813
Road No. 6.—Bimlipatam and Vizagapatam to Tuni ..	(1) Pendur	790,483	120,517	15,060
	(2) Anakápalle	860,921	286,697	6,095
	(3) Timmapuram ..	952,787	310,732	22,583
Road No. 9.—Tuni to Rajahmnudry and Cocanada ..	(1) Kattipudi	908,037	118,171	15,249
	(2) Jangampet	443,077	59,000	342
	(3) Rajanagaram ..	1,211,945	140,472	5,453
	(4) Rajahmundry ..	1,920,106	198,097	1,364
	(5) Sámalkót	1,905,937	289,257	16,519
Road from Sámalkót to Cocanada	(1) Cocanada	594,047	37,143	2,963
Road No. 10.—Rajahmundry to Ellore	(1) Kovvur	97,636	78,740	9,979
	(2) Ellore	216,785	3,836	..
Road No. 11.—Tállapúdi to Ellore *via* Jangareddigudem.	(1) Jangareddigudem ..	101,214	9,858	1,586
Road No. 12.—Road from Masulipatam to the Hyderabad frontier *via* Jaggayapet.	(1) Masulipatam	700,024	37,381	..
	(2) Bezváda	508,536	125,141	3,863
	(3) Chillakallu	541,855	29,100	4,685
Road No. 25.—Road from Madanapalle to Chittoor *via* Punganúr and Palmanér.	(1) Punganúr	179,895	27,820	8,214
Road No. 34.—Salem to Atúr and on Vriddháchalam ..	(1) Atúr	424,717	242,955	19,722
Road No. 42.—Máyavaram to Tiruturaipúndi ..	(1) Perinjeri	191,211	225,454	1,420
	(2) Kallamangudi ..	249,907	176,636	544
	(3) Sannamallur ..	335,374	204,544	2,616
	(4) Tiruválúr	223,291	308,103	2,835
	(5) Sengandi	1,454,719	170,746	317
Road No. 48.—Palamcottah to Tenkási *via* Ambásamudram.	(1) Tenkási	656,208	308,136	3,362

(A true Extract.)

(Signed) P. RAJARATNA MUDALIAR,
Secretary.

To the Secretary to Government, Revenue Department.
Copy to all Collectors.

APPENDIX I.

From E. H. HAZELTON, Esq., V.S., A.V.D., Inspector of Cattle Diseases, Madras Presidency, to the Secretary to the Commissioner of Revenue Settlement and Director of the Department of Land Records and Agriculture, dated Kodavasal, 4th July 1890, No. 766.

I have the honor to submit, herewith, the Annual Report of this Department for the official year 1889-90.

The strength of the Department on 31st March was as under :—

Inspector	1
Deputy Inspector	1
Sub-Assistant Director of Agriculture	1
Stock Inspectors	18
Clerk	1
Compounder and Clerk	1
Peons	3
Total ...	26

The Deputy Inspector has continued in charge of the pony-breeding and castration operations in Coimbatore during the year. He investigated and treated an outbreak of rinderpest in the Coimbatore district, and also brought to light a case in which a number of cattle were poisoned in that district in January. They were undoubtedly cases of deaths from poisoning, 8 out of 15 cattle dying in one day and the contents of the viscera of one were sent to the Chemical Examiner, Madras, who found arsenic in them, the matter was brought before the Magistrate at Palladam, but was dismissed from want of proper evidence. No Stock Inspector has been available for duty in the Coimbatore district, but the Deputy Inspector has been available when wanted for cattle-disease prevention. He inspected the work of the Stock Inspector of Trichinopoly.

The Sub-Assistant Director of Agriculture has worked under me during the year; in the early part of the year he was working in Tinnevelly where rinderpest had been prevalent. He attended the Sivalaperi fair which is held a few miles from Tinnevelly; the fair is an important one and is held in connection with the Chitra car festival. The zemindar of Maniyáchi took an interest in the fair, and by sending cattle of his own and inducing others to do likewise, raised it to its present importance. A few cases of rinderpest were found there and dealt with. After Easter, the Sub-Assistant Director proceeded to inspect the work of the Stock Inspectors of Tinnevelly and Madura and reported on his inspection; he then went to Tanjore to assist and inspect the work of the Stock Inspector there; he remained in Tanjore for nearly four months and was busily engaged during that time in treating cases of disease, principally rinderpest which was rife in the district. He found that many cases of deaths from infectious disease had not been reported, and brought the conduct of the village officers concerned to notice, and they were punished.

Hospital pounds had been erected in Tanjore in many places, but owing to the scarcity of waste land, many of the sites were considered objectionable by the Sub-Assistant Director (also unless a trained agency is available for the charge of these pounds, they are not of much use, as the ryots do not care to send their sick animals out of their houses, and will not make use of the facilities afforded them of themselves). He notes that it was remarkable that only the disease anthrax was prevalent in the Nannilam and Negapatam taluks and afterwards in Patukóta. He submitted a full report on the work of the Stock Inspector of Tanjore, which will be referred to later on.

In September he proceeded to the Chingleput district where he remained until February 3rd, 1890, supervising the work of extra Stock Inspectors and working the Cattle Disease Prevention Act. The operations in this district will be referred to in another place.

He notes that, as a rule, rinderpest is very mild among cattle that are generally kept at pasture in jungles and grazing tracts, and he quotes instances in which the mortality among such cattle was only about five per cent of attacks, and in an instance of infection of the cattle of a village called Agili from a herd which had been infected, the disease proved to be very mild, and all the cattle recovered ; this is a very peculiar circumstance, and I can only explain it by inferring that the disease rinderpest has worn itself out in the Chingleput district, for it has been prevalent there to my knowledge for nearly three years, and its virulence has become much less. I do not think this will apply to every portion of the district, but it may to some localities. My own experience being that herds at pasture or stall-fed animals are equally affected and the mortality in both cases is considerable. He notes that there is a common belief among ryots that if rinderpest appears in any village during a new-moon it will prove very serious, but not so if the moon is waning.

In Tinnevelly, Madura and Tanjore districts, gingelly-oil, milk and plantains are extensively used in the treatment of rinderpest. He met with a case in which a buffalo had suffered from rinderpest and recovered in 1888 and was again attacked and died in 1889, and he infers that one attack does not confer a prolonged immunity from the disease. He notes that in parts of Tanjore, lard is suspended in cattle-sheds as a preventive against rinderpest, but no facts are brought forward to prove its efficacy.

He attended the Bellary and Salem Agricultural Exhibitions and accompanied some Japanese gentlemen on a tour of agricultural inquiry in the Presidency. He proceeded on privilege leave on 25th February 1890.

The Sub-Assistant Director has been fully occupied during the year and has performed the work entrusted to him with great energy and thoroughness.

Stock Inspectors.

Stock Inspectors have been concentrated during the past year in badly infected areas from time to time. The work done by them when away from their own districts will be remarked on under the heading of "Special preventive measures."

I now give a districtwar *résumé* of work done during the year.

Ganjam.—No Stock Inspector was available for work in this district although cattle diseases were prevalent.

Vizagapatam.—No Stock Inspector worked in this district during the year. Cattle diseases were not generally prevalent.

Godávari.—A Stock Inspector was posted to this district in October last. This Inspector was admitted to the Department after a year's training as a probationer on November 4th, 1889. Rinderpest, anthrax and epizootic aphtha were prevalent in the táluks of Rámachandrapuram, Cocanada, Narasápur, Pithápuram and Peddápuram. He found that there is a large trade in raw hides from Cocanada which tends to spread infection. He states that he has done his best to explain to ryots and village officers the nature, cause, and prevention of contagious diseases, and he has left written instructions and prescriptions with the village officers of every village he has visited and he has read and explained the instructions issued by this office for the treatment of rinderpest. He states that the ryots will not take the trouble to disinfect their infected sheds and that they are opposed to the burial of carcases, because of the value of the hide The same superstitious ideas as to the cause of rinderpest exist in the Godávari, and it is common for the ryots to attempt to avert the anger of their goddess by sacrifices of sheep, goats or buffaloes. Another custom is to hang the carcase of an animal that has died of rinderpest to a tree in a conspicuous part of a village. He notes that Sunn hemp (Janumu) is grown as a fodder crop, after the paddy is harvested, and stored for the hot weather.

The leaves of sugarcane are largely used as fodder in the Peddápuram taluk. He inspected the cattle markets at Drákshárámam, Pálakol and Pithápuram, to which places cattle from Vizianagrum and Nellore are brought for sale; good buffaloes are brought from Vizianagrum and are much valued by the ryots. He met with no cases of poisoning. He gave some instruction to a taluk peon who had some knowledge of cattle practice.

Previous to the posting of the present Stock Inspector, the Stock Inspector of Ganjam was working during April, May and part of June in this district when he visited the taluks of Cocanada, Pithápuram, Peddápuram, Rajahmundry, Rámachandrapuram and Tuni. He then was placed on the sick list, and on rejoining his duty, proceeded to Kistna.

Kistna.—Rinderpest was very severe in this district during the year, especially so in the taluks of Vinukonda, Palnád, Répalle and Bápatla. A Stock Inspector was working singlehanded there up to September when a number of Inspectors were concentrated in the district, and I proceeded there to supervise them. Further remarks on this subject will be found under the heading "Special Establishment and operations." After the work of the special establishment was concluded, viz., in December 1889, it was found necessary to leave three Stock Inspectors in the district; one was subsequently removed, and two men are now working there Disease has very much subsided.

Rinderpest was the most prevalent disease, but anthrax and foot and mouth disease were also met with.

Nellore.—A Stock Inspector was posted to this district on 6th July 1889, but he did not proceed to the district until December 1889, as he was on special duty in the Kistna district. He was admitted into the Department on 6th July after 13 months' training as a probationer. I shall remark on his work as a probationer in its place. He has been working in the district since January and has visited Rápúr, Gúdúr, Kávali and part of Kandukúr taluks.

Rinderpest has been prevalent in each of these taluks. The Stock Inspector has adopted a method of segregation as follows: "All the infected animals are kept within the premises, &c., of the village while the healthy animals are penned on the arable, waste, or pasture land outside the village; when any animal is suspected, it is at once separated and taken into the village." (This plan is frequently adopted by the ryots, and although I think that it is open to grave objections, yet it is better to get the above system carried than to allow the sick and healthy to

remain together unless a trained staff is available to work hospital pounds, the good effected by starting hospital pounds and leaving the ryots to work them is very inappreciable. A Stock Inspector with the whole district for his range must keep moving and so cannot do much work at any one pound).

The Stock Inspector has found much difficulty in inducing the pariahs and ryots to relinquish the hides of animals dead of a contagious disease, and he quotes an instance of a village in which the practice of skinning the carcases of animals dead of rinderpest was being carried on largely and openly and that his advice to bury all animals in the skin was received with so much opposition that he was obliged to leave the village. He notes that the registers of cattle mortality are maintained very irregularly and he is trying to improve this. He has met with no cases of poisoning.

Kurnool.—The Stock Inspector has visited 6 taluks of the district and has been on special duty in Kistna. Márkápur taluk has been badly infected with rinderpest. He notes that it is very difficult to segregate cattle as there are no cattle-sheds apart from the dwelling-house of the family of the owners and that although the advantages of the practice are known to many, yet, owing to this fact, they do not adopt it. (I think that there is a great deal of truth in this, but also that it would be an easy matter for ryots to segregate their sick cattle if they wanted to do so). He has many times observed that pariahs send the flesh of animals which have died of rinderpest to their friends and relatives in adjacent villages, and he thinks this spreads the disease.

There is a custom in this district of keeping the dung of cattle in pits dug to receive it; once a year the manure is removed and carted to the fields; the pit often becomes filled with water during the rains, which water is very considerably contaminated, and if rinderpest has prevailed in the village, the water in these pits must become a frequent source of contagion during the hot weather; he has often seen cattle drinking the water from these pits. He notes that the people in many of the villages refuse to have their cattle-sheds, which are a part of the ordinary living room, fumigated with sulphur. He has met with no cases of poisoning.

Bellary.—Cattle diseases were reported from all the taluks except Ráyadrug, Kúdligi and Bellary. From April to August, the Stock Inspector was working in the taluks of Adóni, Alúr and Hospet, and he visited most of the affected villages. He was transferred to the Kistna district on special duty at the end of August, while there, he underwent his examination for promotion which he successfully passed; he returned to his own district in December and assisted at the Agricultural Exhibition held at Bellary in December. He attended the cattle fairs held at Mylar and Kuruvatti and also the festival at Humpi. Cattle disease was not very prevalent in the district during the year; rinderpest, anthrax and epizootic aphtha were reported. He states that the village registers of cattle mortality are often found improperly kept, and he frequently has had to report village officers for not maintaining a register; the entries are made very irregularly; in many cases deaths of sheep and goats are seldom registered. No cases of cattle poisoning were met with during the year.

Anantapur.—Rinderpest was reported from all the taluks of the district, but Penukonda and Hindupur suffered most severely.

From July to October, the Stock Inspector was on the sick list. The Stock Inspector of Salem was doing duty in the district for 5 months; he worked in the three taluks of Penukonda, Hindupur and Madaksíra. The Stock Inspector states that he has not received a single report of disease among sheep or goats, and on asking why village officers do not report disease in these animals, they say that it is very difficult to ascertain the number of deaths and that those that die are consumed by their owners. He states that the Madigas (pariahs) carry diseased flesh for consumption to other villages. When there is rinderpest in a village, these men invite their friends and relations and distribute the flesh, hides and carcases which are taken to other villages where the refuse is thrown aside anywhere; sick animals are taken along the public roads and into villages. He has seen in the taluks of Hindupur, Penukonda and Dharmavaram ryots who have removed their healthy cattle to the fields and left their sick in the houses, but he states that they do not do this thoroughly and that often the same men look after the sick and the healthy. He states that the registers of cattle mortality are still imperfectly maintained, although he has been trying hard to get them properly maintained. He attributes these irregularities to the inadequate punishment awarded when the errors are pointed out, saying that, as a rule, a warning only is given and he is quite certain that half of the actual mortality is not reported.

He found no cases of cattle poisoning during the year.

Cuddapah.—The Stock Inspector joined the district on the expiry of his leave in April 1889, and remained there until September, when he was sent on special duty to the Kistna. He inspected almost all the infected villages of Cuddapah, Pulivendla, Kadiri and Madanapalle. He states that he has taken every care to instruct the ryots in the advantages of segregation, the necessity of pure water, nursing and the use of salt in food. Rinderpest was the principal disease met with; no cases of epizootic aphtha were seen. The taluk of Madanapalle was severely infected with rinderpest. The cattle in this taluk are not so valuable as those met with in the taluks

bordering upon Nellore. This Stock Inspector was sent to Nellore for duty after his duty in the Kistna was finished, and he worked in the Rápúr taluk where epizootic aphtha was very prevalent; he afterwards proceeded to the Kandukúr taluk where rinderpest and epizootic aphtha prevailed.

Chingleput.—Special reference is made to this district under the heading "Special operations;" the Stock Inspector was working in the district the whole year.* Rinderpest and anthrax were the prevailing diseases and every taluk was infected. Epizootic aphtha was severe towards the end of the year, but did not cause much loss; the district has suffered severely from rinderpest during the year.

* Except when he attended the Agricultural Exhibition at Salem.

North Arcot.—The Stock Inspector was working in the district from April to May when he proceeded on leave for one month and 19 days. In September he was sent to Chingleput on special duty, but remained there only a month when he was sent to attend the Subramania fair in November, and remained on duty in the district (South Canara) until the end of the year. Cattle disease was not very prevalent during the year.

South Arcot.—The Stock Inspector, South Arcot, has been working in Tindivanam, Cuddalore, Chidambaram, Kallakurchi, Tirukoilúr and Villupuram taluks during the year; the other taluks were not much troubled by cattle disease. Early in the year, Tindivanam was much infected. The Stock Inspector found great difficulty in carrying out the provisions of Act II of 1866 in the district and cites instances in which the village officers would do nothing for him. In the Chidambaram taluk he erected four hospital pounds, two at Government expense and two at the ryots' cost; in the former 13 animals were admitted, of which 5 died and the rest recovered; in the latter 19 were impounded, 14 died and 5 recovered. In addition, there were very many infected cattle not impounded, because of the unwillingness of their owners to take the trouble; he worked in this taluk (Chidambaram) from May to July when disease much abated. From July to October he worked in the Cuddalore and Chidambaram taluks when rinderpest and anthrax were severe, afterwards he proceeded to Tirukoilúr when rinderpest was very rife, and where the reports and registers of cattle disease were very irregularly kept; he was successful in improving the registration; a pound was built at an infected village. He stayed more than two months in this taluk having plenty of work. He proceeded to attend the Tiruvannámalai fair in November, returned to Tirukoilúr after a fortnight's absence. He went to Kallakurchi to inspect an infected village and arrange about the erection of a hospital pound which was not after all found necessary. After Christmas, foot and mouth disease spread over the district, and because of its mild character, it was never taken much notice of by village authorities.

He then proceeded to Salem for duty at the Agricultural Exhibition there. Having completed this duty he returned to Cuddalore taluk, from which he had received reports of rinderpest, and finding that the outbreak was subsiding, he proceeded to Tirukoilúr taluk where there was rinderpest; he continued in this taluk at the end of the year.

Owing to the failure of the monsoon, fodder for cattle is very scarce in the district, and they suffer very severely. He met with no cases of cattle poisoning during the year. He complains that there is no law to prevent the pariahs removing the hide from a case of rinderpest and disposing of the carcase as they please.

Salem.—The Stock Inspector worked in the district during the year with the exception of the months of August, September, October, November and December, during which he was sent on duty to Anantapur. Rinderpest was reported from all taluks except Tirupatúr; during the latter portion of the year epizootic aphtha prevailed. He notes that in several cases rinderpest was erroneously reported as variola. He states that the ryots gladly receive the medicines he offers and attend to his instructions and that they do segregate their animals but not perfectly; it is more practised in the Hosúr division of the district than elsewhere. He states that the village officers and cattle owners have given him no cause for complaint, and that they have carried out his instructions when they have been able to do so; but he further remarks that he often does not receive reports of disease from villages until very late, owing to many karnams living away from their villages and so remaining ignorant of an outbreak of disease until great damage is done. He notes the following circumstance: that he received a request from a Tahsildar for his services for an outbreak of rinderpest which outbreak was assisted by the pariahs who had a large interest in the Hide trade and who "washed the internal organs in the scanty supply of drinking water to promote the spread of the contagion and thereby to benefit themselves. The suppression of this nefarious practice checked the outbreak." The pariahs were detected by the Stock Inspectors and the Deputy Tahsildar and were warned, but no further action could be taken as there is no legislation providing for this offence other than the Act II of 1866, which was not in force in the district.

Coimbatore.—No Stock Inspector was working in this district which has not suffered severely from cattle diseases.

Trichinopoly.—During the year the Stock Inspector has been working in the taluks of Musiri, Udayárpálaiyam, Kulitalai and Perambalúr.

Rinderpest was prevalent throughout the district, but especially severe in Musiri taluk where the Stock Inspector worked principally. Epizootic aphtha also was severe, but the mortality from this cause was slight. Anthrax was not serious. He inspected the cattle fairs held at Thurayur and Kamanur. He found great difficulty in inducing cattle-owners to carry out his instructions, and notes that they complain that they have not the means to supply their sick cattle with suitable nutriment. He has left written prescription with cattle-owners in addition to the ordinary treatment pursued by himself. He has met with no cases of poisoning.

Tanjore.—The Stock Inspector of this district was appointed on 27th March after having undergone 12 months' probation. The late Acting Stock Inspector of Tanjore was dismissed for various reasons, which are before the Board. He had proved himself utterly unprincipled and useless, having falsified his diaries to a great extent. The present Stock Inspector has only been working a short time.

Tanjore has been seriously infected during the past year, rinderpest and anthrax having prevailed very considerably. All the taluks have been infected.

Madura.—The Stock Inspector of this district was working there for six months—April to October—when he was transferred on special duty to Chingleput where he remained for the rest of the year. During the four months he was in Madura he was on duty at the Madura fair in April; he then accompanied the Sub-Assistant Director of Agriculture on inspection to the Madura and Periyakulam taluks when rinderpest was prevalent; he continued his inspection after the departure of the Sub-Assistant Director. He notes that the fodder supply of cattle in this district is somewhat scanty; a variety of black cholum is grown exclusively as a fodder crop in some parts of the district. Instruction was given to the ryots on the treatment and prevention of communicable diseases, on the use of salt, disposal of carcases, &c., but the Stock Inspector regrets that these instructions were not well attended to, and suggests that they should be enforced during an outbreak of disease. He states that one reason why ryots will not segregate their cattle is prevalence of cattle theft in the district. The registration of cattle mortality is imperfect, and diseases are wrongly classified, rinderpest being often classified as diarrhœa and dysentery. He has met with no cases of cattle-poisoning.

Tinnevelly.—The Stock Inspector of this district was working here from April to September when he was transferred for special duty to Chingleput; he returned to his district at the beginning of March 1890. Rinderpest was not so prevalent in the district as during the previous year, but was nevertheless widely distributed during the early portion of the year. The Stock Inspector worked in the Ambásamudram, Tenkási, Tenkarai, Nánguneri and Otapidáram taluks, treating cases of rinderpest. He notes that he met with cases of sheep-pox in the Ambásamudram taluk, and states that the disease is well known to the ryots as a communicable one, and they make great efforts to prevent the contact of flocks, but when a flock becomes infected the disease is allowed to run its course in that flock, no attempt being made to arrest its progress. He also notes that very little care is taken by the ryots to confine and segregate cases of rinderpest. He remarks that "even persuading people to place the infected animals at a small distance from the villages in a tope or similar locality was not successful. I had to separate the infected animals as far away from the healthy as the places in the possession of the owners of the sick animal, permitted, &c. &c."

The Sub-Assistant Director of Agriculture inspected the work of this Stock Inspector in May and sent in a favorable report. The Stock Inspector noted many irregularities in keeping the village cattle mortality registers and brought them to notice. He left the district for Chingleput in September (his work in Chingleput will be noticed hereafter). He returned to Tinnevelly on 6th March 1890, and proceeded to the Sankaranainárkoil taluk for duty where there was a large outbreak of epizootic aphtha. On 23rd March he proceeded on three months' privilege leave.

Malabar.—Rinderpest and epizootic aphtha prevailed during the year, the former chiefly in the Wynaad and Chirakal taluks, the latter in Calicut, Chirakal, Kóttayam and Ernád. The Stock Inspector attributes the spread of rinderpest, which he states originated in South-east Wynaad, to infection by cart bullocks travelling through the Chirakal taluk. He also states that he received reports only when the disease had established itself thoroughly. He has frequently inspected the slaughter-houses at Calicut, Cannanore, Tellicherry and Badagara. He mentions that the carcases of cattle which die from contagious disease are appropriated by the Pariahs, and the remains are scattered over grazing lands, although instructions are everywhere given that they should be otherwise disposed of. (This matter is receiving attention).

South Canara.—The Stock Inspector of this district was on special duty in the Kistna district from September 1889 till February 1890. The Subramania fair at which the Cattle Disease Prevention Act is introduced was supervised by another Stock Inspector. The fair is held in November.

Rinderpest, anthrax, variola, epizootic aphtha and diarrhœa and dysentery were the diseases met with during the year. The mortality from rinderpest and anthrax was much less than during the previous year. The Stock Inspector alludes to the facilities for segregating

infected cattle in the district, but states that the ryots are too wedded to the customs of their forefathers to do as they are advised. He believes that the manner of disposal of carcases in the village is the chief cause for the spread of the disease. Strict instructions on this subject were issued to village officers both by the District Magistrate and himself, but the Pariahs still obtain the carcases, remove the skin, and cut up the flesh and leave what they don't want on the waste lands, &c. The hide they sell to the hide merchants. The Stock Inspector thinks that "it should be ruled that ryots neglecting to bury diseased carcases properly are liable to punishment and the trade in hides should be legally controlled."

(The trade in hides certainly is a frequent carrier of disease which would not be so much the case were they dried hard before being carted through the country, or still better partially tanned; it is the "green" hide that causes the mischief. Also some legislation is required with regard to the disposal of diseased carcases; at present unless the Cattle Disease Prevention Act is put in force in a district, the ryots cannot be compelled to bury their cattle dead of rinderpest, and unless hospital pounds and keepers are appointed under the Act, nothing can be done; one staff is not large enough to carry out the provisions of the Act, which must be done by a trained agency or it could not be operative).

The work of the South Canara Inspector in the Kistna will be noticed hereafter. He thinks that the subject of cattle diseases and their treatment, sanitation, stock-breeding, &c., should be introduced into primary schools and should be made an optional subject for the primary school examination and compulsory for the candidates for the posts of village magistrates.

Tables of work done by Stock Inspectors during the year are here subjoined.

Remarks on Stock Inspectors.

During the year the Acting Stock Inspector of Tanjore was dismissed for reasons already given. Three probationers were admitted into the department and posted to the districts, five Stock Inspectors were promoted to the grade carrying pay at the rate of Rs. 75 per mensem.

The conduct of most of the Stock Inspectors has been good, but Stock Inspector Venkataramana Sastry has been guilty of insubordination and has been punished. Stock Inspector Canthiah Mudaliar was also found fault with as his work was not good and he has been warned and transferred to another district. Stock Inspector G. Rangiah Naidu has not given satisfaction; his case is under consideration. Stock Inspector C. Visvanatha Iyer has not worked as well as he should have done, being inclined to be lazy; his work is being closely watched.

The other Stock Inspectors have given satisfaction, notably Stock Inspectors B. K. Santaya, Subramania Mudaliar and M. Kuppoosawmy Sastri. Although there has not been such a loss from cattle diseases during the year 1889-90 as took place in 1888-89, yet the Stock Inspectors have been fully occupied; their attention has been more directed to villages from which reports of disease have been received, and as a consequence they have not visited so many non-infected villages; owing to the size of the charge of a Stock Inspector he is often obliged to visit villages from which he has received no reports, and this cannot be always avoided.

Every Stock Inspector complains of the want of a permanent peon to accompany him. At present Stock Inspectors are provided with peons from the taluk in which they may be working; frequently when they want a peon they cannot get one as they are on various duties. During jamabandi it is very difficult to obtain one; moreover, they are given the most useless man as a rule; without a peon very few village officers will pay much attention to the wants of a Stock Inspector, and he has to do everything for himself which naturally detracts from his usefulness as a Stock Inspector. I think they should all be provided with a peon who should remain with them while in the district; this man could be trained and would prove of great assistance to them in their work.

Stock Inspectors are always directed to endeavour to bring about the greatest accuracy in reporting cattle mortality by village officers, and they are constantly bringing to light irregularities in this direction and do their best to rectify mistakes. During the year, in consequence, I believe, of the many instances of error, the form was simplified, and all that is demanded now is that a correct statement of deaths shall be submitted, all information concerning attacks and recoveries being omitted. The system has not been in vogue sufficiently long to enable me to express an opinion upon it, but I think the idea is correct as it will be much more simple to remember and note down only the death than to remember the number of attacks, recoveries, deaths and those remaining sick. Stock Inspectors can readily collect this information on making inquiries.

Of the five probationers who were under training, three have been admitted to the department and two were dismissed as they failed to pass their examinations.

Special operations.—During the year special repressive operations were carried out in two districts in which contagious diseases were very rife, viz., in Chingleput and Kistna districts. In the former the Sub-Assistant Director and 4 Stock Inspectors worked; in the latter, I supervised the work of 6 Stock Inspectors (5 at first). As regards the work done in Chingleput, Act II (1866), the Cattle Disease Prevention Act, was notified and placed in operation, when at first the

operations were confined to the taluk of Madurántakam and later other taluks were included. Unfortunately for the success of the operations, rinderpest, the prevailing disease, assumed a sporadic form as soon as the extra staff began work, and it was seldom that an outbreak could be met with; no sooner did a few cases occur and a hospital pound became apparently necessary, than the disease would die out for a week or a fortnight; this did not give much work for the pounds, and as a matter of fact only two pounds were erected and these were insufficiently used. Notwithstanding the peculiar behaviour of the disease, a large number of cattle were treated but not as was intended in hospital pounds.

I append an extract from a report of the Sub-Assistant Director on this subject—

"From 26th September 1889 till 3rd February 1890, I worked in the Chingleput district.

* * * *

On making careful inquiries in the villages of Madurántakam, Mambakkam, Karungali, Thottanaval, Madhur, Alapakkam, Atheyurmelthuli, Olugarai, &c., where the disease appeared to be rife, we found that rinderpest had almost subsided, so that I reported to the Collector as well as to the Inspector of Cattle Diseases that there was no work in Madurántakam taluk for any of us. The Collector ordered me to wait for a week more before coming to the conclusion that rinderpest had subsided in the taluk.

Disease indeed reappeared in Mambakkam and appeared to be on the increase. I lost no time in applying for sanction for an hospital pound. I believed that there would be no necessity for accommodating more than 4 sick animals at any time. The pound was erected at a cost of Rs. 7 and was ready on 22nd October. The pound was erected within two days after sanction was received from the Collector; no sooner was the pound ready than the disease appeared to have almost subsided * * * Subsequent to the erection of the pound, till I left the district, 12 cases occurred, a few cases occurring at long intervals; of these, only 3 could be impounded." (An explanation has been submitted on this point from which it appears that the disease was mild, that the ryots were somewhat obstructive and so animals were left out of the pound).

A case of rinderpest from another village was also impounded at the Mambakkam pound—

"In Madhur disease had very much abated when the pound was ready for use."

* * * *

"In November, 14 animals were impounded and in December 1 animal from the adjacent village of Malanathur Madhur was impounded. Of the 15 animals impounded, 5 died and the rest recovered.

* * * *

About the middle of November, the Stock Inspector of Tinnevelly found that the carcase of a bullock belonging to one Yellappa Pillai of Madhur which had died at the hospital pound had been disinterred and taken away by certain Pariahs who before the death of the animal had attempted in vain to strike a bargain with the owner for the hide * * * The Pariahs admitted before the Tahsildar-Magistrate that they disinterred the carcase, but since the police had charged them under section 379 of the Indian Penal Code with having committed theft, the magistrate discharged them on the ground that the disinterment of an infected carcase did not directly cause any wrongful loss to any person and that the buried carcase was not a property in anybody's possession * * * *

I wrote to the Tahsildar before the case was inquired into pointing out that a poundkeeper is a public servant whose duty it is, under the Cattle Disease Prevention Act, to bury the carcases of the animals dying at the pound, and that whoever voluntarily disinters a carcase buried under his orders simply undoes his work, and that if as often as a poundkeeper gets an infected carcase buried in compliance with the requirements of law, some Pariahs disinter it, the public servant is, in effect, obstructed in discharging his lawful duty, and that therefore the Pariahs were chargeable under section 186 of the Indian Penal Code. The Tahsildar was not of that opinion and dismissed the case.

* * * *

It has been decided, I believe, that no prosecution can be conducted against any body on account of the traffic in infected hides, which is indeed a serious nuisance, tending to spread infection broadcast in the country."

"Two ryots of Melanathur Madhur, named Manna Reddi and Subba Reddi, were prosecuted for resisting the impoundment of their sick animals. Subba Reddi was convicted and fined 8 annas by the Sheristadar-Magistrate and the other was discharged for want of evidence."

"Complaints were preferred against 6 more ryots of Melanathur Madhur for not giving notice about their 13 animals being attacked with rinderpest. On account of the jamabandi, the Tahsildar deferred inquiring into the cases until the special prevention establishment was dissolved, and I hear that the cases were all discharged." (This delay on the part of the Tahsildar in disposing of these cases is being inquired into by the Collector, but I have not heard of the result—E.H.H.")

In the Kistna district the operations were confined at first to the Vinukonda taluk and on the subsidence of disease there the taluks of Palnád and Bápatla were attended to. I have already reported fully on the subject of these operations, but I give here an extract from one of my reports to show the state of affairs there :—

" In Vinukonda taluk, rinderpest first appeared to any extent this year at the end of July and the beginning of August last, when large numbers of cattle were attacked. The cattle, with but few exceptions, had just arrived in the taluk from surrounding taluks, notably Bápatla, which annually sends very large numbers of cattle for grazing to the forests of Vinukonda. It is reasonable to infer that the disease was introduced by these " foreign" cattle for the following reasons, viz. :—

(1) Rinderpest was prevalent in Bápatla taluk during May and June last.

(2) There was very little disease (rinderpest) in the Vinukonda taluk until after the arrival of many of the herds in July and early in August.

(3) Many villages on the road leading into this taluk (there is only one main road) have been infected with rinderpest.

(4) Rinderpest appeared in several villages about the same time as the herds arrived in their neighbourhood; this I have found to be a fact at the villages of Ramidicherla, Garikipad, Ayanampalliam, Kauvulapuram, Bollapally and Yeepur.

(5) In the case of the herd of buffaloes mentioned in my last report at Garikipad, these arrived from a village in Bápatla where rinderpest had caused a large mortality, and a very large number of these animals died at Garikipad from the after-effects of the disease.

2. " Rinderpest having been introduced, the causes for its spread were several. Firstly, the herds are brought by the owners or persons interested in them to the neighbourhoods of the grazing areas and are there left in the charge of " watchers " or care-takers, who drive them to and from the pastures and who are men belonging to the local villages. These men have no interest themselves in the welfare of the animals other than the prospective receipt of some small sum (4 annas in many cases) for each head handed over to the owners who return to receive the cattle in February or March of the ensuing year. Moreover so many cattle are placed in charge of a few men that it is practically impossible that they can look after them properly when disease breaks out; as a matter of fact they do not. Forcible instances of this have come under my observation. On one occasion, I had some twenty buffaloes under treatment and had to get them from among the rest of the herd in order to treat them. To effect this, I had to get the assistance of the men in charge. I managed very well for a few days, but when the novelty wore off, I could only get one or two men to help, and as these were not in charge of the portions of the herd to which several of the sick belonged, I could not get the animals at all. The men afterwards came to take the herd to graze, and they were asked to get the sick out for us, and they refused, saying that they did not care whether they died or not, and that they were not going to take the trouble to help. One man was prevented for a time from taking his portion of the herd to graze, when he left the place, saying he did not mind and that they could stop there all day for all he cared.

" It was impossible to force these men to do as they were requested, for the village officers had no power over them, and as the cases were not of a contagious nature (see report, dated 1st November 1889, No. 1113, paragraph 6), they could not be proceeded against under Act II of 1866.

" Again, when disease breaks out, the men in charge do not trouble to separate the sick from the healthy, but all are jumbled together in the pens by night and graze together during the day, those animals too ill to accompany the herd being left to take care of themselves.

" Carcases are left to be eaten in the nearest nullah when they die near the pound; if in the forest, they are left where they die. The Madigas of the nearest village take the hides when they can, and carcases are never buried. There is no one to bury them, for they do not die in a village but on the outskirts, often a mile or so away. The roads used by the cattle are thickly strewn with carcases during an outbreak, and so the whole area becomes contaminated. The jungles used by the different herds adjoin and disease is transmitted in every direction (Rauvulapuram and Garikipad are supposed to have become infected in this manner in the first instance from Ramidicherla).

3. " The disease commencing in August ran its course very rapidly, the greatest mortality occurring in September and early in October. During October very heavy rain fell over the whole taluk, and during a week or ten days in that month the death-rate was very heavy; this was caused by the exposure to rain and cold of the already debilitated animals. Now (November 14th) I think that the disease will gradually subside. The condition of the herds has now much improved; those parts which were almost unbearable owing to the carcases rotting all round are

now clean and healthy; hundreds of carcases were washed away by the freshes in the water-courses rushing down from the neighbouring hills; the pens have been washed clean and so have the animals themselves, and most of the sick animals have either recovered or died, and at the present moment there are only four centres in which rinderpest exists in the taluk, and at each of these a Stock Inspector is working.

"Since we have been working in the taluk, that is from 26th September last to date, pounds have been erected at the villages of Vinukonda, Rauvulapuram, Bokamantalapad, Ayanampalliam, Agnigundala, Angalur and Valepur, while at Ramidicherla, Ballapally, Malepadu, Garikipad and Yeepur we have been working. At all these places carcases have been buried, in some places burnt, and cattle treated. Ryots and others have been told and shown the benefits to be derived from segregation of the sick and the proper disposal of carcases, but the reasons I have stated above in paragraph 2 preclude much hope that any advice will bring forth fruit.

"The ryots generally look upon us with dislike, they do not desire our help, they are caused a certain amount of trouble by the erection of a pound and the impounding of their cattle, and they don't like the trouble and don't think the removal of sick from the healthy any use. At Agnigundala great resistance was made to the sick cattle being removed to the pound and some cases have been brought to the notice of the Magistrate. Village officers dislike the trouble we cause them. At Ballapally this was carried to such an extent that a pound was not erected until after the outbreak had subsided and consequently it has been of no use."

Disease had greatly subsided by December, and only three of the Stock Inspectors remained in the district afterwards, one working in the Palnád and two in Bápatla taluk. The hospital pounds were continued in operation in the latter taluk and were well looked after by the Inspectors, and eventually the extra Stock Inspector was withdrawn from Bápatla and two men left in the district where they are now working.

I attach a talukwar statement of cases treated in hospital pounds. I cannot speak too highly of the good work shown by the Stock Inspector of South Canara, B. K. Santaya, upon whom burden of the work fell, he having been in charge of the pounds at Agnigundala, Vinukonda taluk, where he was assisted by probationer Moses Abraham, and Santravur in Bápatla; both of these inspectors suffered very severely from fever contracted at Agnigundla which was very malarious, and the probationer had to be sent on sick leave for two months in consequence.

RETURN showing the number of sick animals admitted into the hospital pounds under Act II of 1866 in Vinukonda, Palnád and Bápatla taluks, Kistna district, from 6th October 1889 to 22nd March 1890.

Name of pound.	Number of Animals			
	Admitted.	Died.	Cured discharged.	Remaining.
Agnigundala, Vinukonda taluk	165	62	96	7
Rauvulapuram do.	11	2	9	..
Vinukonda do.	14	6	8	..
Ayanampalliam do.	22	7	15	..
Angalur do.	2	1	1	..
Ballapally do.	..	..	..	..
Bokamantalapad do.	..	..	..	..
Valepur do.	17	2	15	..
Mandadi, Palnád	9	3	6	..
Adegoppalla Palnád	..	..	..	..
Vellapalliam Bápatla	10	5	5	..
Karamchedu do.	21	11	10	..
Santravur do.	40	29	11	..
Total ..	311	128	176	7

Medicines.—A statement is here given of the medicines despatched from this office for use in the districts during the year. I have always held that a universal medicine for a certain disease is not of much benefit as individual cases of the same disease require individual treatment, but the state of cattle disease in this Presidency makes it absolutely necessary that some such medicine should be provided for wide distribution and use, and I have been careful to see that as little damage as possible can accrue from the unintelligent administration of the drugs prescribed. I have again to add that the medicines supplied have been appreciated in many parts of the Presidency.

Dry cinchona febrifuge has received a short trial and, as suitable cases are met with, it will again be prescribed. I have recently submitted a report on this subject. Disinfectants were of considerable use in the hospital pounds in the Kistna.

Statement showing the number of doses of medicines despatched to the undermentioned districts during the official year 1889-90.

District.	Astringent powder for rinderpest, 2nd stage.	Carbolic balls for anthrax and rinderpest, 1st stage.	For foot and mouth disease, external application.	For foot and mouth disease to make gargle.	Cinchona febrifuge.		Disinfectants.	
	DOSES.	DOSES.	LBS.	LBS.	LBS.	OZ.	CWTS.	LBS.
Anantapur	..	..	..	..	..		..	..
Arcot, North	1,200	600	..	..	..		1	..
Arcot, South	900	750	..	..	0	8	2	..
Bellary	2,000	2,000	100	56	0	8	4	..
Canara, South	..	..	..	..	..		..	..
Chingleput	1,000	1,000	..	..	0	8	1	..
Coimbatore	1,000	1,000	100	56	1	0	..	..
Cuddapah	2,000	2,000	..	..	..		1	..
Ganjam	..	..	..	..	..		..	..
Godávari	1,000	1,000	..	..	0	8	1	..
Kistna	7,000	5,000	..	..	0	8	4	..
Kurnool	1,000	1,030	..	..	..		1	..
Madras	..	..	..	5	..		..	..
Madura	1,500	2,000	..	2	..		..	2
Malabar	2,000	2,000	..	..	..		..	..
Nellore	600	..	..	..	2	0	..	..
Nilgiris	..	..	..	30	..		..	60
Salem	..	1,000	..	..	..		2	..
Tanjore	3,000	3,000	..	..	..		..	..
Tinnevelly	..	500	..	..	..		..	..
Trichinopoly	..	..	..	..	..		..	..
Vizagapatam	..	..	..	..	..		..	..
Total ..	24,200	22,880	200	149	5	8	17	62

Agricultural Exhibition.

The exhibitions at Bellary in December 1889 and Salem in February 1890 were attended by a staff of Stock Inspectors, the Sub-Assistant Director and myself. Reports on these have been submitted to the Board and no further remarks are needed here.

Out-break of Epizootic Aphtha at the Monegar Choultry, Madras.

During December an outbreak of epizootic aphtha occurred at the Monegar Choultry, Madras, which was treated by the Sub-Assistant Director and a Stock Inspector. One hundred and eight cases were segregated and treated, and the out-break subsided in a few days.

Movements of Inspector of Cattle Diseases.

My movements during the year were as follows:—

During April I stayed at head-quarters; I was unable to travel owing to continued attacks of fever contracted during my tour in Madura during March.

On 11th May I left for the Coimbatore district in order to attend the Avanáshi fair; from there I proceeded to the Tinnevelly district to attend the Kannicheri fair, and returned to Madras towards the end of the month. During June I went to Cuddalore and Trichinopoly to examine Stock Inspectors for promotion, and also examined the Stock Inspector of Anantapur at Tadpatri. I then proceeded to Tirupur and Kángyam (Coimbatore) to inspect the fair and herd of the Palaycota Pattagar and returned to Madras on 19th June.

On 9th July I proceeded on a tour of inspection in the Anantapur and Cuddapah districts which lasted until 31st August.

On 11th September I started for the Kistna district, and remained there on duty until 7th December when I left for Bellary to attend the agricultural exhibition there.

I remained at head-quarters during January and left on 4th February for Mylar, Bellary district, to attend the cattle fair held there. I returned to Madras on 10th February and left on 15th for Salem to attend the agricultural exhibition there. After that I proceeded on tour through the district, and visited the breeding tracts on the banks of the Cauvery and marched through the district to Hosúr whence I returned to Madras on 11th March 1890.

Remarks.

During my inspections I have taken every opportunity of lecturing to the ryots on the nature, causes, treatment and prevention of contagious diseases among cattle, and I have also instructed Stock Inspectors in the above to enable them to explain the matter to the ryots and put it to them in the simplest form.

I have personally treated many cases of rinderpest, but I have only once come across a case of anthrax, and I have not seen any cases of variola in cattle or sheep. Epizootic aphtha I have met with, but not to any extent. At the village of Pendurty in Anantapur, where rinderpest was prevalent at the time of my visit, I remained a week and established a hospital pound with the assistance of the reddi, who is a very intelligent man. I think the ryots there will adopt the same system should another out-break occur, as we were successful in stopping the disease.

I published a small pamphlet on rinderpest during the year and drew up some instructions to be published in District Gazettes on the same subject.

Conjointly with the Assistant Director of Agriculture I wrote a report on the supply of cattle in the Madras Presidency.

The service registers of the subordinates of the department have been maintained and verified up to date.

Cattle Disease Prevention Department.

STATEMENT showing actual receipts and charges incurred during the official year 1889-90.

Items.	Sanctioned estimate.	Up to last month.	In this month.	Total.	Amount available on the 1st April 1890.	—
RECEIPTS.—*Nil.*	RS.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
EXPENDITURE.						
Salaries.						
Inspector of Cattle Diseases.	6,600	6,050 0 0	550 0 0	6,600 0 0	..	..
Deputy Inspector of Cattle Diseases.	3,600	3,300 0 0	300 0 0	3,600 0 0	..	..
Sub-Assistant Director of Agriculture.	2,470	2,260 0 0	210 0 0	2,470 0 0	..	..
Stock Inspectors	} 15,000	{ 11,425 10 10	1,239 0 6	12,664 11 4	} 1,889 5 4	..
Probationers		{ 445 15 4	..	445 15 4		
Total, Salaries ..	27,670	23,481 10 2	2,299 0 6	25,780 10 8	1,889 5 4	..
Establishment.						
Clerk	420	385 0 0	35 0 0	420 0 0	..	..
Compounder	300	275 0 0	25 0 0	300 0 0	..	..
Peons	240	219 3 7	20 0 0	239 3 7	0 12 5	..
Total, Establishment ..	960	879 3 7	80 0 0	959 3 7	0 12 5	..
Allowances.						
House-rent of Inspector of Cattle Diseases.	600	550 0 0	50 0 0	600 0 0	..	..
Travelling allowance of Inspector of Cattle Diseases.	2,200	2,379 12 7	323 0 10	2,702 13 5	..	502 13 5
Travelling allowance of Deputy Inspector of Cattle Diseases.	1,100	1,078 13 0	157 8 0	1,236 5 0	..	136 5 0
Travelling allowance of Sub-Assistant Director of Agriculture.	1,000	778 9 6	49 14 0	828 7 6	171 8 6	..
Travelling allowance of office establishment.	350	343 6 1	68 15 8	412 5 9	...	62 5 9
Travelling allowance of Stock Inspectors.	} 5,000	{ 3,696 7 6	619 10 0	4,316 1 6	} 306 2 10	..
Travelling allowance of Probationers.		{ 377 11 8	..	377 11 8		
Total, Allowances ..	10,250	9,204 12 4	1,269 0 6	10,473 12 10	..	223 12 10
Supplies and Service.						
Cost and distribution of medicines.	1,500	805 8 9	513 9 8	1,319 2 5	180 13 7	..
Total, Supplies and Service ..	1,500	805 8 9	513 9 8	1,319 2 5	180 13 7	..

Statement showing actual receipts and charges incurred during the official year 1889-90—*cont.*

Items.	Sanctioned estimate.	Up to last month.	In this month.	Total.	Amount available on the 1st April 1890.	—
Contingencies.	RS.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
* Purchase and repairs of tents	1,300	668 2 5	..	668 2 5	631 13 7	..
Office—						
Postage	170	162 0 0	10 0 0	172 0 0	..	2 0 0
Telegram	40	15 3 0	0 8 0	15 11 0	24 5 0	..
I (*b*) Contingencies ..	420	503 1 2	78 10 11	581 12 1	..	161 12 1
Deputy Inspector of Cattle Diseases—						
Postage	40	20 0 0	..	20 0 0	20 0 0	..
Telegram		..	..	..		
Contingencies		..	..	..		
Stock Inspectors	650	419 11 2	80 7 5	500 2 7	149 13 5	..
Total, Contingencies ..	2,620	1,788 1 9	169 10 4	1,957 12 1	662 3 11	..
Total, Prevention of Cattle Diseases.	43,000	36,159 4 7	4,331 5 0	40,490 9 7	2,509 6 5	..

* This amount was sanctioned for the purchase and repairs of tents for the Inspector of Cattle Diseases and Assistant Director of Agriculture.

APPENDIX II.

TABLE showing the sick and lame Animals treated by Stock Inspectors during the official year 1889-90.

Number.	Names.	Number of villages inspected.		Number of sick animals.				Remarks.
		Infected.	Non-infected.	Admitted for treatment.	Recovered.	Died.	Unknown.	YRS. M. D.
1	P. Raghava Pillai	86	122	838	..	24	814	On sick leave 0 0 8
2	K. Padmanabhaya	116	96	423	291	89	43	,, privilege leave .. 0 1 19
3	M. Venkatramana Sastri ..	139	83	292	257	35	..	
4	A. Canthiah Mudaliar ..	136	94	506	157	108	241	
5	B. K. Santaya	131	92	457	316	110	31	On sick leave 0 0 15
6	M. Kuppusawmi Sastri ..	93	130	225	145	79	1	,, privilege leave .. 0 0 15
7	K. Sethu Row	189	178	397	277	117	3	
8	C. Viswanatha Iyer ..	85	95	152	118	34	..	On privilege leave .. 0 2 12 ,, sick leave 0 0 28
9	V. P. Subramani Mudaliar..	96	179	384	210	48	126	On privilege leave .. 0 0 24
10	K. Ramen	125	81	1,137	295	14	828	Do. do. 0 1 20
11	R. Narrayana Row	232	38	901	230	193	478	
12	V. Sithamber Devoo ..	81	63	178	113	45	20	On sick leave 0 5 4
13	G. Rungiah Naidu	143	70	387	166	84	137	
14	M. Hossen Ally Saib ..	94	167	364	292	29	43	
15	B. Subramaney Iyer ..	50	51	277	220	56	1	On privilege leave .. 0 0 10
16	S. A. Strinivassa Raghaven	129	170	289	228	61	..	Suspended 11th September 1889; since dismissed.
17	V. Chockalingam Pillai ..	41	10	352	11	11	330	Promoted to the grade of Stock Inspector from 6th July 1889.
18	R. Kanniah Naidu	88	52	495	50	11	434	Promoted to the grade of Stock Inspector from 14th October 1889.
19	Moses Abraham	..	..	..	..	..	..	Promoted to the grade of Stock Inspector from 27th March 1890.
	Total ..	2,054	1,771	8,054	3,376	1,148	3,530	

APPENDIX III.

STATEMENT showing the number of Villages inspected by the Stock Inspectors in each Taluk of the District in which they were posted for duty during the official year 1889-90.

1		2		3		4		5		6	
V. Sithamber Devoo.		R. Karniah Naidu.		M. Kuppusawmi Sastri.		V. Chockalingam Pillai.		P. Raghava Pillai.		C. Viswanatha Iyer.	
Godávari and Kistna.		Anantapur, Cuddapah and Godávari.		Kistna.		Kistna and Nellore.		Cuddapah, Kistna and Nellore.		Anantapur.	
Taluks.	Number of villages visited.	Taluks.	Number of villages visited.	Taluks.	Number of villages. visited.	Taluks.	Number of villages visited.	Taluks.	Number of villages visited.	Taluks.	Number of villages. visited.
Godávari District.		*Anantapur District.*				*Kistna District.*		*Cuddapah District.*			
Tuni	12	Tadpatri	1	Palnád	30	Vinukonda	7	Pulivendla ..	28	Anantapur ..	25
Cocanada	12	Anantapur	1	Vinukonda	33	Palnád	2	Cuddapah ..	38	Gooty	43
Pithápuram	12	Penukonda	37	Bápatla	47	*Nellore District.*		Kadiri	15	Tadpatri ..	49
Peddápuram ..	15	Hindupur	11	Répalle	38	Rápúr	14	Madanapalle ..	23	Dharmavaram ..	17
Rajahmundry ..	18	*Cuddapah District.*		Sattenapalle ..	14	Gúdúr	14	Ráyachóti	26	Penukonda ..	24
Rámachandrapuram.	14	Kadiri	1	Guntúr	13	Nellore	4	*Kistna District.*		Hindupur ..	18
Kistna District.	61	*Godávari District.*		Narsaraopet ..	13	Kávali	6	Vinukonda ..	9	Madakasíra ..	4
Palnád		Cocanada	40	Bezváda	12	Kandukúr	4	Palnád	19		
		Rámachandrapuram.	23	Bandar	12			*Nellore District.*			
		Rajahmundry ..	3	Núzvíd	11			Rápúr	21		
		Narsápur ..	6					Kandukúr	29		
		Amalápuram ..	1								
		Pithapur	8								
		Peddápuram ..	8								
Total ..	144		140		223		51		208		180

Statement showing the number of Villages inspected by the Stock Inspectors in each Taluk of the District in which they were posted for duty during the official year 1889-90—*cont.*

7		8		9		10		11		12	
B. Subramaney Iyer.		G. Rungiah Naidu.		A. Kanthiah Mudaliar.		K. Padmanabhaya.		K. Sethu Row.		S. A. Strinivassa Raghaven.	
Bellary and Kistna.		Kurnool and Kistna.		Chingleput.		North Arcot, Chingleput and South Canara.		South Arcot.		Tanjore.	
Taluks.	Number of villages visited.	Taluks.	Number of villages visited.	Taluks.	Number of villages visited.	Taluks.	Number of villages visited.	Taluks.	Number of villages visited.	Taluks.	Number of villages visited.
Bellary District.		*Kurnool District.*				*North Arcot District.*					
Adóni	27	Márkápur	95	Chingleput	55	Wálajápet	16	Cuddalore	125	Kumbakónam ..	147
Alúr	12	Cumbum	62	Madurántakam ..	113	Gudiyátam	20	Chidambaram ..	88	Mannárgudi ..	3
Bellary	12	Nandyál	9	Conjeeveram ..	25	Arcot	10	Kallakurchi ..	44	Tanjore	14
Hadagally	7	Rámallakót	16	Tiruvallúr	13	Chittoor	9	Tirukoilúr	30	Negapatam ..	32
Harpanahalli ..	13	Pattikonda	16	Ponnéri	10	Palmanér	8	Tiruvannámalai ..	32	Máyavaram ..	56
Hospet	10			Saidápet	14	Arni	13	Tindivanam ..	25	Nannilam ..	21
Kúdligi	..	*Kistna District.*				Puttur	10	Villupuram ..	23	Pattukóta ..	26
						Punganúr	3				
Kistna District.		Vinukonda	15			Kálahasti	14				
						Mauderpauk ..	9				
Bezváda	2										
Guntúr	1					*Chingleput District.*					
Masulipatam ..	1										
Narsaraopet	1					Madurántakam ..	23				
Vinukonda	15										
						South Canara District.					
						Mangalore	40				
						Udipi	35				
						Uppinangadi ..	2				
Total ..	101		213		230		212		367		299

Statement showing the number of Villages inspected by the Stock Inspectors in each Taluk of the District in which they were posted for duty during the official year 1889-90—*cont.*

13		14		15		16		17		18	
R. Narrayana Row.		M. Venkatramana Sastri.		V. P. Subramani Mudaliar.		M. Hossen Ally Saib.		B. K. Santaya.		K. Ramen.	
Trichinopoly.		Madura and Chingleput.		Tinnevelly and Chingleput.		Salem, Anantapur and Madras.		South Canara and Kistna.		Malabar.	
Taluks.	Number of villages visited.	Taluks.	Number of villages visited.	Taluks.	Number of villages visited.	Taluks.	Number of villages visited.	Taluks.	Number of villages visited.	Taluks.	Number of villages visited.
		Madura District.		*Tinnevelly District.*		*Salem District.*		*South Canara District.*			
Musiri	115	Madura	62	Tenkarai	14	Salem	11	Mangalore	52	Chirakal	71
Trichinopoly	20	Tirumangalam	3	Ambásamudram	38	Atúr	12	Kásaragód	27	Kóttayam	40
Perambalúr	96	Periyakulam	7	Nánguneri	19	Hosúr	62	Uppinangadi	39	Calicut	47
Kulitalai	26	Dindigul	14	Otapidáram	23	Dharmapuri	24	Udipi	31	Kurumbranád	48
Udayárpálaiyam	13	Sivaganga	9	Tenkási	23	Krishnagiri	13	Coondapoor	29		
		Mutukulatúr	5	Sátúr	21	Tirupatúr	6	*Kistna District.*			
		Melúr	7	Sankaranainárkoil.	21	Uttankarai	24				
		Tirupatúr	1	*Chingleput District.*		*Anantapur District.*		Vinukonda	19		
		Tirushuli	12					Bápatla	36		
		Chingleput District.		Madurántakam	73	Penukonda	48				
				Chingleput	43	Hindupur	60				
		Madurántakam	55			*Madras.*					
		Chingleput	47			Monegar Choultry	1				
Total	270		222		275		261		223		206

APPENDIX IV.

Remarks on the statistics of mortality among the Live Stock in the Madras Presidency during the official year 1889-90, submitted by the Inspector of Cattle Diseases.

Cattle.

During the year 1889-90 *Rinderpest* has again created a great deal of havoc among the cattle of this Presidency, but happily it has not been so severe as it was during 1888-89, less than half the number of deaths having been reported for the year under review; in all 38,252 deaths from this cause have been reported from the Presidency during the year. April and October 1889 were the months in which the greatest number of deaths occurred, and from November 1889 to March 1890, the disease has gradually been growing less prevalent, the deaths reported in the latter month being more than 2,000 less than in October last.

I remarked last year, when reviewing the statistics of mortality, that the mortality classed as due to diarrhœa and dysentery should be attributed to rinderpest, and I have no doubt on this point; so in this year it will be noticed that almost as many deaths have been reported from these causes as from rinderpest, viz., 30,368. I am sure that these cases with but few exceptions have been due to rinderpest, and it is but reasonable to conclude that they have been erroneously reported. If, therefore, they are included in the mortality caused by rinderpest, we have a grand total of 68,620, more than 75,000 less than in the year 1888-89.

The districts which suffered most from the ravages of rinderpest, including also the cases reported under diarrhœa and dysentery, were North and South Arcot, Malabar, Kurnool, Kistna, Cuddapah, Chingleput, Tanjore, Madura, Anantapur, Ganjam and Nellore.

Anthrax.—This disease caused more loss during the past year than in 1888-89, but was far less prevalent than rinderpest; it was most virulent in the months of August, September and October and considerably decreased in February and March last; the total loss reported from the Presidency from this cause for the past year was 22,502. The districts which suffered most being North Arcot, Kistna, South Arcot, Cuddapah, Chingleput and Tanjore.

Epizootic Aphtha.—The mortality from this cause was considerable and greater than in the previous year; the total deaths numbered 7,811, which represents a very large number of attacks. The months of December, January and February were the most fatal months probably, because, of inclement weather, cold, &c., operating on debilitated animals. The districts of Ganjam and Trichinopoly suffered most.

Variola—was not very prevalent, 3,290 deaths being reported from this cause; most casualties from this disease occurred in November, and the districts of Vizagapatam and Coimbatore were mostly affected. No deaths from this disease were reported from Ganjam, Godávari, Chingleput, South Arcot and Nílgiris.

Other Diseases.—Deaths from the above causes were numerous, 26,243 being reported from the Presidency; from July to January most deaths occurred, and the districts of Ganjam, Vizagapatam, Godávari and Kistna reported most cases. The total loss of cattle from disease during the past year is reported to be 128,466, which shows a great decrease when compared with the mortality of the previous year.

Sheep and Goats.

The mortality of sheep from rinderpest, anthrax, epizootic aphtha, and diarrhœa and dysentery was greater than in the previous year, being in all 39,599. The greatest loss reported is under the head of Other diseases, 13,615; Variola ovina caused nearly 8,000 deaths. Epizootic aphtha was not very severe, for out of 2,836 deaths from this cause, it is reported that about 1,200 deaths were caused in the Bhadráchalam taluk, Godávari, by bad weather during November last. The greatest mortality from disease occurred in November and December, and the districts of Anantapur, Bellary and Cuddapah reported most deaths.

Horses and Ponies.

One hundred and fifty-three horses and ponies are reported to have died from disease during the year, which is a considerable increase in number over the mortality of the previous year—anthrax (9), diarrhœa and dysentery (6), variola (4) and other diseases (134). Most mortality occurred in the month of July, and the districts of Anantapur and Coimbatore reported most casualties.

I have made no remarks on the statistics relating to mortality from causes other than disease, as I did not deem it necessary.

APPENDIX V—1.

Statistics of Mortality among Cattle in each District of the Presidency of Madras during the official year 1889-90.

Districts.	Total stock.	Number of deaths due to disease.								Number of deaths due to other causes.							Total deaths from all causes.	
		Rinder-pest.	Diarrhœa and dysentery.	Anthrax.	Epizootic aphtha.	Variola.	All other diseases.	Total.		Natural decay.	Acci-dents.	Snake-bites.	Poison-ing.	Wild animals.	Total.		Number.	Rate per mille.
								Number.	Rate per mille.						Number.	Rate per mille.		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Ganjam ..	232,900	2,238	655	1,468	2,393	..	5,530	7,851	33	709	* 13,143	22	..	36	13,910	60	21,761	93
2. Vizagapatam.	120,400	255	1,876	337	64	1,267	2,746	4,328	35	1,727	42	23	1	34	1,827	15	6,155	50
3. Godávari ..	589,600	925	204	107	151	..	2,570	1,397	2	5,113	192	92	..	289	5,686	10	7,083	12
4. Kistna ..	964,200	3,792	1,595	2,500	227	130	2,152	10,990	11	18,985	1,500	237	..	191	20,913	22	31,903	33
5. Nellore ..	598,800	482	2,047	860	429	67	1,727	6,455	10	4,671	299	78	2	64	5,114	9	11,569	19
6. Kurnool ..	582,700	3,531	1,859	1,142	198	27	1,715	12,287	21	7,171	726	152	..	460	8,509	15	20,796	36
7. Bellary ..	600,800	700	97	739	44	89	1,480	3,821	6	7,180	565	22	3	201	7,971	13	11,792	19
8. Anantapur ..	587,700	2,264	635	1,086	485	40	1,097	5,907	10	5,501	393	29	1	169	6,093	10	12,000	20
9. Cuddapah ..	985,200	1,160	3,590	2,220	266	249	529	9,200	9	7,015	620	97	5	503	8,240	8	17,440	17
10. North Arcot.	731,900	2,111	4,615	4,440	265	1	10	12,157	17	13,007	436	330	..	527	14,300	19	26,457	36
11. Chingleput ..	407,900	1,200	2,749	2,185	324	..	1,397	7,938	19	10,619	273	449	..	45	11,386	28	19,324	47
12. South Arcot.	984,700	4,519	1,943	2,394	299	..	725	10,161	10	7,208	233	232	..	90	7,763	8	17,924	18
13. Salem ..	967,300	411	411	50	78	106	1,006	1,402	1	1,365	158	57	..	491	2,071	2	3,473	3
14. Coimbatore ..	1,183,900	890	1,560	309	187	587	1,229	5,260	5	7,209	397	137	..	792	8,535	7	13,795	12
15. Trichinopoly.	592,600	1,281	2,305	185	1,013	91	714	5,589	9	12,293	486	194	..	73	13,046	22	18,635	31
16. Tanjore ..	823,500	2,645	979	1,872	226	12	378	6,963	8	11,544	269	165	1	6	11,985	15	18,948	23
17. Madura ..	637,600	2,982	498	151	80	281	213	4,370	7	5,196	406	148	2	315	6,067	9	10,437	16
18. Tinnevelly ..	483,800	455	709	107	260	79	138	1,823	4	4,456	96	126	..	64	4,742	10	6,565	14
19. Nilgiris ..	59,000	198	29	2	120	..	346	487	8	1,430	219	3	..	418	2,070	35	2,557	43
20. Malabar ..	901,200	4,362	1,967	201	242	124	337	7,233	8	15,599	400	258	..	2,376	18,633	21	25,866	29
21. South Canara.	666,900	1,851	45	147	460	140	204	2,847	4	15,850	1,261	44	..	3,373	20,528	31	23,375	35
Total ..	13,699,600	38,252	30,368	22,502	7,811	3,290	26,243	128,466	9·3	163,848	22,114	2,895	15	10,517	199,389	14·6	327,855	23·9

* About 13,100 of these deaths occurred in November owing to exposure from storm.

APPENDIX V—2.

Statistics of Mortality among Sheep and Goats in the Presidency of Madras during the official year 1889-90.

Districts.	Total stock in the district.	Number of deaths due to disease.								Number of deaths due to other causes.							Total deaths from all causes.	
		Rinderpest.	Diarrhœa and dysentery.	Anthrax.	Epizootic aphtha.	Variola (sheep-pox).	All other diseases.	Total.		Natural decay.	Accidents.	Snake-bites.	Poisoning.	Wild animals.	Total.		Number.	Rate per mille.
								Number.	Rate per mille.						Number.	Rate per mille.		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Ganjam ..	60,100	762	48	238	109	..	215	1,372	23	38	5,908	..	..	22	5,968	99	7,340	122
2. Vizagapatam.	41,600	330	887	10	4	1,587	252	3,070	74	617	48	..	..	152	817	19	3,887	93
3. Godávari ..	114,200	191	..	317	* 1,611	3	..	2,122	18	655	248	2	..	71	976	9	3,098	27
4. Kistna ..	486,900	8	199	44	87	..	1,182	1,520	3	1,654	217	9	..	413	2,293	5	3,813	8
5. Nellore ..	553,900	33	286	157	19	19	1,382	1,896	3	1,440	480	8	..	312	2,240	4	4,136	7
6. Kurnool ..	554,400	469	283	378	42	82	1,560	2,814	5	524	250	23	..	953	1,750	3	4,564	8
7. Bellary ..	681,400	34	109	1,587	..	232	2,515	4,477	7	3,547	514	..	..	244	4,305	6	8,782	13
8. Anantapur ..	936,200	121	595	823	216	2,636	2,023	6,414	7	2,040	323	3	2	650	3,018	3	9,432	10
9. Cuddapah ..	1,138,700	737	599	953	7	1,293	756	4,345	4	1,414	340	14	..	1,778	3,546	3	7,891	7
10. North Arcot.	668,000	259	298	428	1	586	62	1,634	2	2,283	90	21	..	529	2,923	4	4,557	6
11. Chingleput ..	259,900	11	75	66	54	476	122	804	3	1,769	52	31	..	276	2,128	8	2,932	11
12. South Arcot.	745,400	542	127	25	249	..	636	1,579	2	764	6	3	..	63	836	1	2,415	3
13. Salem ..	980,700	1	45	13	1	69	194	323	..	640	52	23	..	643	1,358	1	1,681	1
14. Coimbatore ..	1,255,860	39	168	157	70	114	1,890	2,438	2	5,161	1,277	41	..	1,411	7,890	6	10,328	8
15. Trichinopoly.	905,300	23	217	82	146	133	219	820	1	8,152	778	62	..	509	9,501	10	10,321	11
16. Tanjore ..	445,100	5	3	..	..	1	24	33	..	1,103	54	1	..	40	1,198	3	1,231	3
17. Madura ..	696,100	737	69	312	57	246	490	1,911	3	3,135	808	49	..	214	4,206	6	6,117	9
18. Tinnevelly ..	788,000	187	1,031	64	149	485	89	2,005	2	5,310	322	38	..	521	6,191	8	8,196	10
19. Nílgiris ..	6,200	1	..	..	14	..	1	16	2	35	5	..	..	15	55	9	71	11
20. Malabar ..	62,300	2	1	..	..	..	1	4	..	361	19	..	..	194	574	9	578	9
21. South Canara.	9,500	..	..	..	..	..	2	2	..	57	24	1	..	40	122	13	124	13
Total ..	11,389,700	4,492	5,040	5,654	2,836	7,962	13,615	39,599	3·5	40,699	11,815	329	2	9,050	61,895	5·4	101,494	8·9

* About 1,200 of this number occurred in Bhadráchalam taluk owing to bad weather during November 1889.